Mission Restoration Project

Wildlife Report

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for:
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Okanogan-Wenatchee National Forest

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Regulatory Framework

National Forest Management Act (NFMA)
NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19). Sensitive species and Management Indicator Species (MIS) are identified to meet requirements of this act.

Endangered Species Act (ESA)
ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species. This includes any activities funded, authorized or carried out by the agency.

Migratory Bird Treaty Act (MBTA)
MBTA established an international framework for the protection and conservation of migratory birds. This Act makes it illegal, unless permitted by regulations, to pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird. Under the provisions of the MBTA, the unauthorized take of migratory birds is a criminal offense, even if it is unintentional.

Executive Order 13186Responsibilities of Federal Agencies to Protect Migratory Birds (2001)
This order directed agencies whose activities could have a measurable negative effect on migratory bird populations to develop a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) to promote the conservation of migratory bird populations. It further directed agencies, to the extent permitted by law and subject to the availability of appropriations and within Administration budgetary limits, and in harmony with agency missions, to (1) support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions; (2) to restore and enhance the habitat of migratory birds, as practicable; and (3)to prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

Bald and Golden Eagle Protection Act
Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 688 [a]; 50 C.F.R. 22). The U.S. Fish and Wildlife Service has issued National Bald Eagle Management Guidelines to advise landowners and land managers of when protective measures may be required to minimize effects to the species. These guidelines provide recommendations to avoid disturbance at nesting, communal roosting and foraging areas, and suggest additional recommendations to benefit bald eagles.

Management Direction

Okanogan National Forest Land and Resource Management Plan
Forestwide Standards and Guidelines (Forest Plan)

Diversity 4-1 Successional stage diversity shall be provided on all suitable timber lands managed with even-aged systems, in mixed conifer plant communities, by maintaining, at a minimum, the following amounts of each described successional stage. (Mature successional stage is not synonymous with old growth.) The amounts shall be maintained for each township: grass/forb- 5%, seedling/sapling 10%, poles 10%, young forest- 5%, mature-5%.

Old Growth 5-1 No scheduled or non-scheduled timber harvest or firewood collection shall be permitted in mixed conifer old growth stands.

Old Growth 5-3 Sufficient stands that have potential to develop old growth characteristics shall be identified as replacement old growth to provide for 5% of suitable forest land acres in an old growth condition in perpetuity.

Old Growth 5-4 Management requirements for species dependent on old growth or mature stands shall be provided. The species are spotted owls, barred owls, pileated woodpeckers, pine marten (now American marten), and three-toed woodpeckers.

Wildlife Planning 6-1 Manage to provide a minimum of 30 percent cover (15 percent thermal/l5 percent hiding) on deer summer range. Block sizes for summer thermal cover should range from 20 to 100 acres; and for hiding cover, from 5 to 40 acres. Cover should be spatially distributed across the landscape and provided on a gross area basis.

Wildlife Planning 6-5 Forestwide, dead tree habitat shall be managed to maintain primary excavator populations to at least 60 percent of their biological potential. In the lodgepole pine working group where existing tree size prevents meeting the guidelines, patches containing the largest dead trees and replacement green trees shall be retained and distributed in the treatment unit to approach populations meeting 60 percent of their biological potential.

Wildlife Planning 6-6 In riparian areas and old growth stands, dead tree habitat shall be managed to maintain primary excavator populations at 100 percent of their biological potential.

Wildlife Planning 6-9 Maintain continuous suitable habitat on ridgetops that provide wintering areas for blue grouse.

Wildlife Planning 6-10 Active raptor nest sites shall be protected through the nesting season (until young are fledged).

Wildlife Planning 6-1 1 Raptor nest sites should be protected. Depending on the individual situation and the biological needs of the species, a primary zone extending up to 500 feet from the nest site (750 feet from goshawk nest site) should be managed to provide raptor habitat. In some areas a secondary restricted activity zone may be necessary outside the primary zone: during the active nest season (through August), certain project activities may be limited. This secondary zone may extend up to one-quarter mile from the nest. When a nest site has not been occupied by a pair for five consecutive years, the site may be managed according to the direction of the management area. Nests located after the project contract has been purchased will not be considered under this guideline.

Wildlife Planning 6-12 For raptor nests located during contract activities, to the extent practicable, the following should apply: a) accipiters - major project activities (i.e, road construction, logging) within 1/4 mile of active accipiter nests should be avoided from the onset of nesting until the young are fledged (mid-August); b) other raptors - nest trees and four to five adjacent large trees (required for fledgling) should be protected during the active nesting

season-the onset of nest construction until the young are fledged (mid-August); these trees may be harvested following current year nesting activities. Major activities (i.e., road construction, logging) should be postponed within 750 feet of the nest tree during incubation and until initial brooding are completed or until the young birds have established thermoregulation.

Wildlife Planning 6-13 Drainages containing hardwoods shall be managed to perpetuate hardwoods as a stand component during early conifer seral stages. Hardwoods shall be perpetuated in associations where it is the climax forest community. After regeneration treatment in hardwood stands, discourage livestock browsing for at least two growing seasons.

Wildlife Planning 6-17 Threatened and endangered species shall be managed according to recovery plans. Coordinate management with U.S. Fish and Wildlife Service and the Washington State Departments of Fisheries and Wildlife.

Wildlife Planning 6-1 8 Consultation with the US. Fish and Wildlife Service shall be initiated when threatened or endangered species may be affected by resource proposals.

Wildlife Planning 6-19 Sensitive plants and animals should be protected.

Protection Fire and Fuels 19-7 Woody debris shall be left on the forest floor for wildlife habitat, long-term site productivity, soil fertility, and, where necessary, for microsite protection and seed. A sufficient amount of this debris shall be uncharred to provide for terrestrial wildlife, long-term soil productivity, and other purposes.

Protection Fire and Fuels 19-8 Treatment of natural fuels shall be prohibited in identified old growth stands.

Protection Fire and Fuels 19-9 In stands managed as future old growth, fuels treatment including prescribed fire shall provide for the retention of all key components of old growth.

Management Area Prescriptions

MA 14 and MA26 All identified deer winter range should be managed for the following well distributed cover:

Percent of Deer Winter Range Cover by Area in Prescription 5 (in winter range), 14, and 26

Winter Range Cover	Methow and Other
Snow Intercept Thermal	>15%
Winter Thermal	>25%
Hiding	>0%
Total:	>40%

MA14 and MA26 Where natural forest vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis.

MA14 and MA26 Where potential is not present as a result of previous management activities, manage to attain these percentages.

MA5 and MA25 Minimum cover amounts shall be 30% (15% hiding and 15% summer thermal cover) of the gross Management Area acreage and well distributed.

MA14 Minimum cover amounts shall be 40% (20% hiding and 20% summer thermal cover) on the gross Management Area acreage and well distributed.

MA14 Operating season for logging and post-sale operations shall be restricted where necessary to protect roads, soil, water, and wildlife resources. To protect fawning (June) and deer during winters (December through March), the operating season shall be decided on a case by case basis in fawning areas and deer winter range.

MA14 To limit wildlife disturbance, road density shall be limited to 2 miles of road open to motorized use per square mile of discrete individual Management Area. Exceptions to this road density may be permitted provided they meet the goals of the Management Area.

MA14 Access by motorized vehicles shall be prohibited on deer winter range, December through March, except for designated through routes. Winter haul may be permitted provided the goals of the Management Area are met.

MA25 Minimum cover amounts shall be 30% (15% hiding and 15% summer thermal cover) of the gross MA acreage and well distributed.

MA25 To limit wildlife disturbance, road density shall be limited to 3 miles of road open to motorized use (not including snow machines) per square mile of discrete individual Management Area.

MA26 Cavity nester habitat shall be managed to provide at least 80% of potential woodpecker population size.

MA26 Scheduled and non-scheduled timber harvests shall be designed to perpetuate deer habitat and to address current habitat needs.

MA26 To protect deer during winter, operations shall be prohibited December through March except east of the Okanogan River. Logging and post-sale operations shall be limited to protect fawning during June.

MA26 To limit wildlife disturbance, road density shall be limited to 1 mile of road open to motorized use per square mile of discrete individual Management Area. Exceptions to this road density may be permitted provided they meet the goals of the Management Area.

MA26 Access by motorized vehicles shall be prohibited December through March, except for designated through routes. Winter haul may be permitted provided the goals of the Management Area are met. Access through fawning area by motorized vehicles shall be prohibited in June, except where designated open.

Northwest Forest Plan Standards and Guidelines (NWFP)

Late-successional Reserves: The plan establishes late-successional reserves (LSRs) that are managed to protect and enhance late-successional and old growth conditions. Silvicultural activities within LSRs have 2 principal objectives: development of old-growth forest characteristics including snags, logs on the forest floor, large trees, and canopy gaps that enable establishment of multiple tree layers and diverse species composition; and prevention of large-scale disturbances by fire, wind, insects, and diseases that would destroy or limit the ability of the reserves to sustain viable forest species populations. Non-silvicultural activities that are neutral or beneficial to the creation and maintenance of late-successional habitat are allowed.

Matrix Allocation: Matrix lands are those within the Northwest Forest Plan area that are outside LSRs or other designated areas. Guidelines for matrix lands include:

- Retaining coarse woody debris that is already on the ground during logging and other land management activities and providing a renewable supply of large down logs well distributed across the landscape.
- Regeneration harvests must maintain a minimum of 120 lineal feet of logs per acre greater than or equal to 16" diameter and 16' long. Partial harvests should follow same guideline, but modified to reflect timing of stand development.
- Retain 15% of the area associated with each cutting unit for green tree and snag retention. A general guide is that 70% of the total area to be retained should be aggregates of moderate to larger size with the remainder as dispersed structures. Patches and dispersed retention should include the largest, oldest live trees, decadent or leaning trees and hard snags occurring in the unit.
- Providing for retention of old-growth fragments in watersheds where little remains.
- White-headed woodpeckers, black-backed woodpeckers, pygmy nuthatches, and flammulated owls are species that would not be sufficiently protected by application of Northwest Forest Plan mitigation measures for riparian habitat protection (USDA and USDI, 1994). Mitigation standards and guidelines to prevent declines in numbers or distribution include providing sufficient green trees and snags to provide for 100% population potential of these species.
- The Northwest Forest Plan provides protection for bats by requiring surveys of caves, mines, and abandoned wooden bridges and buildings in matrix, and protection of these sites, if occupied, in all land allocations (USDA and USDI, 2001).

Survey and Manage Species: Pre-disturbance surveys are required for species designated as "survey and manage" in all land allocations, if a project within the range of the species would negatively affect the species' habitat. Known sites (locations) for these species are protected. Great gray owls are a survey and manage species under the Northwest Forest Plan. However, surveys are not required because the project area is not within the area recommended for project level surveys.

Revised Recovery Plan for the Northern Spotted Owl: The Revised Recovery Plan for the Northern Spotted Owl (USFWS, 2011) provides direction for forest management. Principles are focused on dry forest restoration treatments.

Other Guidance or Recommendations

- **The Okanogan-Wenatchee National Forest Restoration Strategy: adaptive ecosystem management to restore landscape resiliency. (Restoration Strategy)**

- **Canada Lynx Conservation Assessment and Strategy (LCAS)**

Affected Environment and Environmental Consequences

Considered But Not Analyzed In Detail

Figure1: Resources Considered But Not Analyzed in Detail

Resource	*Habitat type /availability in analysis area*	*Rationale for Dismissing from Further Analysis*
Threatened and Endangered		
Gray wolf (endangered)	Generalist / habitat present	The project area is part of the Lookout Pack's territory. Gray wolves and a rendezvous site are documented in the project area, but no den sites have been found there. Timing restrictions may be implemented if a den or rendezvous site is found. Deer are found across the project area, year-round, and provide a prey base. Deer forage is expected to increase in quantity and palatability as a result of planned treatments, which may increase deer numbers in the area. Disturbance and vegetation changes from treatments would not be expected to negatively affect wolves, although wolves and prey may be temporarily displaced during activities. Current open road density in the project area is 1.1 mile per square mile, and will be increased to 1.2 post-project with alternative 2 (although 13.2 miles of the increased road miles are administrative use, which is estimated to average 1-2 vehicles per year).Alternative 3 would reduce road densities to 0.8 miles per square mile. The determination for wolves is "may affect (due to temporary and short-term disturbance), not likely to adversely affect". Reduction in road density would be a beneficial effect for wolves and their prey (alternative 3).
Grizzly bear (threatened)	Generalist / habitat present	The project area is in the North Cascades Grizzly Bear Recovery Zone. Habitat for grizzlies and a food source (deer, plants) occur across the area. No sightings of grizzly bears have been reported in the project area, but a confirmed sighting occurred in 2015 approximately 60 miles north. Deer, a prey item for bears, would benefit from increased forage expected from project activities. Disturbance to bears and deer would occur during project activities and could displace them temporarily. Road closures and decommissioning would occur and would increase core area for bears. There would be no net loss of core in the bmu. Temporary roads are not in core area. Determination for grizzly bear is "may affect (due to disturbance), not likely to adversely affect". Core area would increase slightly due to road decommissioning in alternatives 2 and 3, and forage for bears and ungulate prey would improve in quality and quantity due to treatments.
Marbled murrelet (threatened)	No	Not within the known range
Critical habitat- Northern spotted owl	No Critical Habitat	Not Critical Habitat

Sensitive Species		
American peregrine falcon	Cliff/talus/no habitat present outside of Wilderness	Cliffs suitable for nesting are not found in the project area. Transient use while foraging around lakes may occur, but buffers would protect lakes.
Common loon	Lakes/habitat present, but not occupied by loons	Blackpine Lake could provide habitat, but is not currently occupied by loons.
Sandhill crane	Non-forest Habitat/habitat present	Sandhills are not known to nest on Forest, but are occasionally sighted during migrations.
Bald eagle	Riparian and Wetlands/no nesting habitat present.	Nesting habitat (along larger fish-bearing streams) is not present in analysis area.
Harlequin duck	Riparian and Wetlands/some habitat.	Nesting habitat is medium size streams and rivers. Activities would avoid riparian areas.
Great gray owl	Cold Moist/habitat present	Meadows & snags provide important habitats, but would be protected during activities. Some minor snag loss expected. Treatments are limited in this habitat. Surveys are not required in this area (south of highway 20)
Sharp-tailed grouse	Non-forest Habitat/ no habitat present	Native grasslands that provide spring/summer cover not present in project area. Prescribed fire may improve habitat if woody vegetation is not destroyed.
Lewis's woodpecker	Riparian and Wetlands/habitat present	Species uses large cottonwoods in riparian and also recently burned areas. Treatments are very limited in riparian habitat, and would not remove cottonwoods or large trees.
Larch mountain salamander	Cliff/talus/no habitat present	Known sites on the Okanogan-Wenatchee are in areas with annual precipitation greater than 60”.
Western pond turtle	Ponds/habitat limited.	Historic range is western Washington and Columbia River Gorge.
Striped whipsnake	Non-forest Habitat/ habitat present.	Not in range. Northern extent of range is central Washington.
Giant palouse earthworm	Scattered/habitat not well-defined	Nearest known location is south of Lake Chelan.
Puget oregonian	Riparian and Wetlands/ habitat present.	Range is western Washington and moister habitats. Mollusk surveys on the Methow district failed to locate species.
Grand coulee mountainsnail	Cliff/talus/habitat present	Project activities would not affect low elevation rocky outcrops.
Shiny tightcoil	Cliff/talus/ habitat present.	Range appears to be further south. Mollusk surveys on the Methow district failed to locate this species.
Blue-gray tail-dropper	Dry Mesic/no habitat	Habitat very limited on Okanogan-Wenatchee, species has not been found.
Astarte fritillary	Non-forest Habitat, high elevation/no habitat.	Habitat not found in analysis area.

Freija fritillary	Non-forest Habitat, high elevation/no habitat.	Habitat not found in analysis area.
Labrador sulphur	Non-forest Habitat, high elevation/no habitat.	Habitat not found in analysis area.
Lustrous copper	Non-forest Habitat, high elevation/no habitat.	Habitat not found in analysis area.
Melissa arctic	Non-forest Habitat, high elevation/no habitat.	Habitat not found in analysis area.
Western bumblebee	Wide variety of habitats/habitat present	Treatments would be beneficial to bees. Reduction of overstory would lead to increases in understory plants providing nectar and pollen.
Meadow fritillary	Non-forest Habitat/ habitat present	Habitat is meadows, aspen stands, grasslands and wet roadsides, pine forest openings. Species would benefit from more open understory.
Peck's skipper	Non-forest Habitat/ habitat present	Mountain meadows, riparian habitats, and roadsides are habitat. Project activities would increase understory species that provide forage and reproductive sites.
Mardon skipper	Non-forest Habitat/ habitat not present.	Not within the known range, which is southern part of Forest.
Tawny-edged skipper	Non-forest Habitat/some habitat present	Uses grassy habitats. Not documented on Forest. Project activities would increase understory species that provide forage and reproductive sites.
Great basin fritillary	Non-forest Habitat/habitat limited.	Montane meadows, ridges, forest openings & rocky ridges. Not documented on Forest.
Zigzag darner	Riparian and Wetlands/habitat present.	High elevation boreal fens/bogs not found in project area.
Subarctic darner	Riparian and Wetlands/habitat present.	Similar to zigzag darner.
Subarctic bluet	Riparian and Wetlands/habitat present.	Similar to zigzag darner.
Boreal whiteface	Wetlands/ habitat present	Marshy ponds. Confirmed in Okanogan Co. Riparian buffers would protect species.
Townsend's big-eared bat	Dry Mesic/habitat present	Foraging habitat (open pine and shrub/steppe) may be near project activities. Large snags may be used as roosts. Snags will be retained, except for minor loss of hazard trees.
Little Brown myotis	Wide range of habitats	Uses wide range of habitats, including human-made for rest and maternity sites. Forages over water. Winters in caves, mines, tunnels. Riparian buffers will protect foraging bats from disturbance.
Wolverine	Wolverine/no habitat present	Analysis area too low in elevation.
Mountain goat	High elevation non-forest/no habitat present outside of Wilderness.	Analysis area is too low in elevation.

Rocky Mtn. bighorn sheep	Cliff/talus/ no habitat present.	Species not present on Forest.
California bighorn sheep	Cliff/talus/ no habitat present.	Habitat not found in analysis area.
Pacific fisher	Fisher/habitat present	Considered extirpated in Washington State, except where reintroductions are occurring.
Cascade red fox	High elevation forest/no habitat	Analysis area too low in elevation.
Strategic Species		
Washington duskysnail	Kettle lakes/habitat not present	No kettle lakes in project area.
Masked duskysnail	Kettle lakes/habitat not present	No kettle lakes in project area.
Chelan Mountainsnail	Open forest/balsamroot habitat	Outside the known range.
Management Indicator Species		
Pileated woodpecker	Mature and old-growth conifer (not Forest Plan old growth)	Activities occurring in mature/old growth habitat would focus on protection of this important habitat type from wildfire and reducing competition between trees to maintain large trees on the landscape. More detailed analysis of old growth treatments can be found in the silviculture section. Pileated woodpeckers use habitats similar to those of spotted owls, and effects would be similar.
Three-toed woodpecker	Mature and old-growth conifer (not Forest Plan old growth)	Activities occurring in old growth habit would focus on protection of this important habitat type from wildfire and reducing competition between trees, thus perpetuating the large trees on the landscape over time. This species uses more boreal habitats, which have limited treatment in the project area.15 acres of mature/old-growth habitat would be thinned to removed smaller trees out of 2,190acres estimated late/old forest. Large trees would not be removed in treatments. Snags would be cut only if they are a safety concern during project activities and along open roads. Snag cutting is allowed for firewood use on 200' on each side of open system roads except in LSRs and riparian reserves. Trees up to 8" dbh would be cut on 325 acres (15%) of the late/old habitat in this environmental zone, which would open the canopy and reduce potential for crown fire and competition between trees. This would reduce the risk of loss of the late/old habitat.
Pacific marten	Mature and old-growth conifer (not Forest Plan old growth)	Project activities are limited in the mesic habitat used by marten. Old growth would be retained, and 50 acres would have understory treatments to protect large trees from wildfire and reduce competition, thus retaining old growth on the landscape for a longer period. Snags and large down wood would be retained except a minor loss of snags as hazard trees and along roads for firewood use (see three-toed woodpecker section, above). 5 acres of small tree thinning and 5 acres of aspen treatments would

		accelerate development of large tree habitat and increase habitat diversity.
Barred owl	Mature and old-growth conifer (not Forest Plan old growth)	Analysis of habitat for spotted owls and other mature and old-growth indicators would cover barred owls, which are an invasive species.
Ruffed grouse	Riparian and deciduous	Riparian buffers will protect habitat. Aspen treatments will improve habitat by removing encroaching conifers, although short-term disturbance (probably several days at most) would occur during implementation. Aspen treatments would occur on 286 acres and would retain the aspen on the landscape by reducing shading by conifers.
Primary Cavity Excavators- pileated, three-toed, black-backed, downy, hairy, Lewis', white-headed woodpeckers, northern flickers, and Williamson's and red-naped sapsuckers.	Dead and defective trees	These are management indicator species for dead and defective tree habitat. Snag habitat does exist within the project area and is not limiting due to insect activity, root rot, competition between trees, and 800 acres of burned area in the easternmost portion of the project area. Snag removal is not part of the proposed treatments unless dead trees are considered hazardous to workers, in which case, they may be felled and left on site to provide large woody debris. Prescribed burning will result in some loss of old, soft snags, but also creates new, hard snags. Snags are also cut along open roads for public safety and for firewood use on 200' on each side of open system roads except in LSRs and riparian reserves. The proposed project would have a very minor negative impact on dead and defective tree habitat on 1742 acres of the ~34, 427 acre project area. It would not affect the size or health or primary cavity excavator populations.
Northwest Forest Plan Compliance		
Survey and Manage Species- Chelan mountainsnail, blue-gray taildropper, Puget Oregonian, Columbia Oregonian, larch mountain salamander, masked duskysnail, and great gray owl.	Discussed above, except Columbia Oregonian, a riparian associated snail.	Columbia Oregonian – range is south-central Washington. Surveys have not found this species in the Methow Valley.
Late-successional Reserves (LSRs)		95 acres of treatment would occur in the LSR (~ 4% of the LSR). Thinning of plantations of small trees comprises the majority of this treatment (89 acres). Thinning would accelerate development of small trees into larger trees, and is consistent with direction for LSRs. Six acres of aspen treatment would also occur. The focus of aspen treatments is to remove encroaching conifers to maintain the aspen. Large conifers within aspen stands would be girdled and become snags, which are important habitat components for old growth-associated and other species.Small conifers would be cut. This would retain deciduous habitat used by many species and increase habitat diversity.

Matrix Guidelines • Retain coarse woody debris during logging. • Retain 120' logs/acre in regeneration units • Provide green trees and snags for white-headed woodpeckers, black-backed woodpeckers, pygmy nuthatches, flammulated owls. • Retain 15% of the area in a unit for green tree and snag retention. • Protect bats by surveying caves, mines, and abandoned wooden bridges and buildings.		Coarse woody debris is not removed during logging. Prescribed burning with low intensity prescriptions does not consume large wood. These guidelines are followed in units by applying ICO (individual, clumps and openings) prescriptions. Caves, mines, abandoned bridges and buildings are not found in project area.
Forest Plan Compliance		
Deer non-winter range	All Management Areas (MAs)	Standards and guidelines require 15% thermal cover and 15% hiding cover, well-distributed across MAs 5 and 25, 20% each across MA 14. Estimated cover for non-winter range is 63%, well-above the Forest Plan standard, and limiting to forage production. Current levels are not sustainable.

Sensitive Species Determinations: The determination for the proposed project for harlequin ducks, great gray owls, Lewis' woodpecker, boreal whiteface dragonflies, little brown myotis and Townsend's big-eared bats, is "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss or viability to the population or species". Habitat for these species is available in the project area, and the species are documented or suspected in the area. Riparian areas, wetlands and ponds will be protected by riparian buffers. Snags will be retained, except for minor loss as hazard trees in logging units and during prescribed burns, where some soft snags are lost and hard snags created.

The determination for the proposed project for western bumblebees, meadow fritillaries and Peck's skippers, is "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss or viability to the population or species".Habitat for these species is available in the project area, and the species are documented or suspected in the area. Reduced overstory canopy closure and creation of small openings through harvest and burning would increase understory plants. The project would have a beneficial impact on these species.

The determination for the remaining sensitive speciesis "No Impact". Either the species or habitat is not present, or the project would not affect the habitat.

MIS Determinations

For discussion of the distribution, habitat, risk factors, conservation status, and population trends, refer to ***Status of Management Indicator Species on the Okanogan and Wenatchee National Forests*** (Youkey, 2011), incorporated by reference into this report.

*Mature and Old Growth Indicators and Primary Cavity Excavators:*Despite minor snag loss, the project would slightly improve conditions for pileated woodpeckers, three-toed woodpeckers, Pacific marten, and barred owls in the project area because it would reduce wildfire risk to late/old habitats in the analysis area, reduce competition on large trees used as nesting/denning/foraging habitat, and accelerate development of stands of large trees. The project would not contribute to a negative trend in viability for these species.

Ruffed Grouse: The project would improve conditions for ruffed grouse in the project area because conifers would be removed in and around 286 acres of aspen stands. The project will not contribute to a negative trend in viability on the Forest.

Resource Indicators and Measures

Figure2: Resource Indicators and Measures for Assessing Effects

Resource Element What issue/concern is being considered?	**Resource Indicator** What will change/be measured?	**Measure (Quantify if possible)** How will change be measured?	**Used to address: P/N, or key issue?**	**Source (LRMP S/G; law or policy, BMPs, etc.)?**
Habitat for threatened species- spotted owls, lynx, and Critical Habitat (CH) for lynx.	Changes to suitable habitat	Acres of habitat change, % landscape. Road changes- miles	Key issue: Threatened species P/N- Wildlife habitat	ESA, Forest Plan, NWFP, Recovery Plan
Habitat for sensitive/focal species- goshawk, gray flycatcher, white-headed woodpecker and western gray squirrel.	Changes to suitable habitat	Acres of change, % landscape. Road changes- miles	Key issue: Sensitive species P/N- Wildlife habitat	NFMA, Forest Plan, Executive Order 13186
Habitat for MIS for mature/old growth forest (spotted owls), winter range (mule deer) and lodgepole pine (lynx).	Changes to habitat	Acres of change, % landscape/area. Road changes- miles	Key issue: Sensitive species P/N- Wildlife habitat	NFMA, Forest Plan, Restoration Strategy, Revised Recovery Plan for Northern Spotted Owl, Canada Lynx Conservation Assessment and Strategy
Habitat for Landbirds	Changes to habitat	Acres of change, % landscape/area.	No	Migratory Bird Treaty Act and Executive Order 13186

Methodology

GIS comparison of habitat types and amount of habitat changed by project activities, field and literature review, and review of district observation database. EMDS computer modeling of habitat and analysis of historical and future range of variability, with field validation. Surveys for spotted owls and goshawks.

Resource Indicator: Change to Habitat for Threatened species- spotted owls, lynx, Critical Habitat for lynx.

Habitat for spotted owls, lynx and Critical Habitat for lynx is present in the analysis area. The basis for effects will be the changes in amount and quality of late/old mixed conifer forest habitat for spotted owls, and changes to roads in suitable habitat.

Lynx habitat will be evaluated by structural stage of habitat within the subalpine fir zone in Lynx Assessment Units (LAUs), and the capability to support the primary prey species of the lynx-snowshoe hare. Critical Habitat for lynx will be assessed by the effects of the treatments on the Primary Constituent Elements (PCEs) of the habitat. Changes to roads in suitable habitat will also be measured.

Resource Indicator: Change to Habitat for Sensitive Species- goshawk, gray flycatcher, white-headed woodpecker and western gray squirrel.

Goshawks use late/old structure forest, aspen stands and large trees. Evaluation of habitat will be based on change to these features. If active territories are found, changes to habitats within the territory or post-fledgling area will be assessed. Roads allow access for falconers to collect young birds, a permitted activity in Washington state. Road changes will be measured.

Gray flycatchers use open ponderosa pine/bitterbrush/bunchgrass stands. Assessment of habitat will be based on the stand changes in the hot/dry and warm/dry environmental zones, and changes to roads in suitable habitat.

White-headed woodpeckers are a focal species for dry forest management, and a sensitive species. Indicators for this species and habitat will be potential habitat changes in hot/dry and hot/warm/dry environmental zones, measured by acres treated, and changes to roads in suitable habitat.

Western gray squirrels use ponderosa pine and Douglas-fir stands, and adjacent riparian black cottonwoods. Ideal conditions may be a balance between open conditions that encourage pine seed production and clumping of trees allowing arboreal travel, secure nesting sites and patches of high canopy closure that produce abundant fungi. Indicators used for this species will be changes in stand structure and open roads.

Resource Indicator: Change to Habitat for MIS for mature/old growth forest (spotted owls), winter range (mule deer) and lodgepole pine (lynx).

Mature/old growth stands, winter range and lodgepole pine stands are found in the analysis area and provide important, and often limited, habitats for many wildlife species.

The late/old successional habitat was modelled using the EMDS process. Changes to this habitat type will be described in the silvicultural report. Large trees will not be harvested. Winter range is delineated by Forest Plan management areas and will be assessed using changes to cover and forage acres, and changes to roads in suitable habitat. Lodgepole pine habitats and boreal forest types used by lynx will be assessed by acres change to stands within the Lynx

Assessment Units (LAUs) and habitat within the LAUs (in the Changes to Habitat for Threatened Species (lynx) section above).

Resource Indicator: Change to Habitat for Landbirds

The Mission project area has 4 primary environmental zones that are habitat for a variety of landbirds. The table below lists the types:

Figure 3: Environmental Zones for Landbird Analysis

Envirozone	*% of Project Area*
Hot-dry Shrub/steppe	21%
Hot/Warm-dry	42%
Cool-Dry	18%
Cool/Cold Mesic	18%

Focal species for the hot/dry and hot/warm ponderosa pine types are white-headed woodpeckers, gray flycatchers, flammulated owls, and chipping sparrows. For the higher elevation mixed conifer habitats, focal species are varied thrush, brown creepers, and goshawks. Ruffed grouse, yellow warbler and willow flycatchers are focal species for riparian and deciduous habitats. Treatments and effects to suitable habitatwill be analyzed.

Intensity Level Definitions

Type:

Adverse: Degrades habitat or reduces amount.

Neutral or Mixed: Some habitat components would be improved or increased, while others are degraded or reduced.

Beneficial: Improves habitat quality or increases amount.

Duration:

Short-term: Up to 5 years.

Medium-term: 5-10 years.

Long-term: 10 or more years.

Intensity:

Negligible: Effect is not measurable.

Minor: Effect is small in scale or amount.

Moderate: Effect would cause a measurable and noticeable loss of habitat.

Major: Effect would cause substantial habitat loss or gain and may affect populations.

Affected Environment

Figure4: Resource Indicators and Measures for the Existing Condition

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition (Alternative 1)
Habitat for threatened species- spotted owls, lynx, and Critical Habitat (CH) for lynx.	Spotted Owl Habitat- late old successional habitat	Nesting, Roosting, Foraging habitat (NRF)- acres.	1,054 acres
		Open roads in NRF-miles	15.7 miles
	Lynx habitat in LAUs	Early successional habitatin subalpine fir zone	Spirit Mountain-300 ac. Methow Gold- 206 ac.
		Open roads in habitat- mi.	2.6 miles
	Critical Habitat for lynx	Acres of designated habitat	12,890 acres
		Open roads in habitat- mi.	9.9 miles
Habitat for sensitive/focal species- goshawk, gray flycatcher, white-headed woodpecker and western gray squirrel.	Suitable habitat	Goshawk- dense stands with large trees.	13,022 acres (38% of non-Wilderness project area)
	Suitable habitat	Gray flycatcher- mid-successional ponderosa pine and shrub-steppe.	21,743 acres of potential habitat (64% of non-Wilderness project area)
	Suitable habitat	Western gray squirrel- Ponderosa pine/mixed conifer and riparian habitats.	21,743 acres of potential habitat (64% of non-Wilderness project area)
		Open roads	45.3 miles in habitat
	Suitable habitat	White-headed woodpecker	21,743 acres of potential habitat (64% of non-Wilderness project area) 0 ac. Buttermilk (below historical levels) 38 ac. Libby (lower end of historical range)

Habitat for MIS for mature/old growth forest (spotted owls), winter range (mule deer) and lodgepole pine (lynx).	Spotted owls Winter range Lodgepole pine	See Spotted owls, above Cover:forage ratios/Forest Plan standards Open roads in habitat- mi. See Lynx and Critical Habitat, above	 MA 14: 52% cover (SIT-22%, WT-29%) MA 26: 35% (SIT-16%, WT-19%) 23.8 miles
Habitat for Landbirds	Pine, mixed conifer and deciduous/riparian habitats.	Effects to suitable habitats	Ponderosa pine- 8,426 acres. Mixed conifer- 1,817 acres. Riparian- 3,412 acres Deciduous- 430 acres

Resource Indicator: Change to Habitat for threatened species

Spotted owls

Spotted owls use late/old mixed conifer habitat for nesting, roosting, foraging and dispersal habitat, generally in the more mesic areas of the district, although nestsites in dry douglas-fir/ponderosa pine stands are also used. Exclusion of fire from dry and mesic forests has increased suitable habitat conditions for spotted owls, but simultaneously resulted in greater risk of habitat loss due to fire (Buchanan et al.,1995; Everett et al.,1997). Everett et al. (1997) suggested that while vegetation manipulation to reduce fire hazard may create less optimal habitat for the Northern spotted owl, habitat effects from vegetation treatments should be considered against the risk of stand replacement fires and the loss of nesting and roosting habitat over large areas. Over 50% of the Northern spotted owl nest-sites in the eastern Cascades of Washington occur within dry and mesic forests (in Gaines, 2010), which are at risk ofuncharacteristic fire (Everett et al., 2000; Hessburg et al., 2007).

While surveys done in the 1980's and 1990's have documented the presence of spotted owls in the project area, follow-up visits indicated that they were either transient through the area or resident single birds. No nests or activity centers have been located. Recent surveys have not located spotted owls in the project area. The western edge of the project area, with its primarily warmer and drier forest types,may be a dispersal route between more mesic habitats in the Twisp River drainage and higher elevations of Gold Creek. Currently, 1,054 acres have been identified as nesting, roosting, foraging habitat (NRF) and 4,113 acres as dispersal habitat, using a combination of EMDS modelling, GIS, and field verification. The NRF habitat is generally marginal, and found primarily in riparian stringers and small, isolated patches. It is unlikely that enough habitat is present in these drainages to support spotted owls, and potential for these vegetation types to produce sustainable owl habitat is extremely limited. Approximately 4,112 acres of dispersal habitat are found in the project area. Like the NRF habitat, these denser stands are at high risk of wildfire and not sustainable.

Approximately 2,335 acres of the analysis area are designated as Late-successional reserve (LSR), to be managed for late-successional habitat for spotted owls and other species. Currently, about 118 acres (5% of the LSR within the project area) of NRF habitat and 306 acres (13% of the LSR within the project area) of dispersal habitat are present in the area.

Habitat in the project area has changed due to fire suppression and logging, which have resulted in reduced numbers of large trees, fragmented stands, and forest conditions dominated by dense multilayered stands of smaller trees that are at risk for wildfire, insects and disease, and that also compete with larger trees. Old forest structural attributes (large trees, large snags and down wood) in these dense overstocked stands are at a high fire risk (Everett et. al., 1997).

Approximately 2.2 miles of open road intersect NRF habitat in the analysis area, which could cause disturbance to spotted owls.

Lynx

Lynx are medium size cats that inhabit mesic coniferous and coniferous/deciduous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Good snowshoe hare habitat is comprised of dense, horizontal vegetation 3-10' above the ground or snow level that provides both browse and cover.

The project area is in the core area for lynx, where long-term persistence of lynx has been documented. Portions of two lynx analysis units (LAUs) are present in the analysis area, and lynx habitat (subalpine fir zone) is present in the western, higher elevation portion of the LAUs. Habitat in both LAUs is dominated by mid-successional structures, with little stand initiation phase that would provide hare browse. There are approximately 2,274 acres of lynx habitat within the LAUs.

The Lynx Conservation Assessment and Strategy (LCAS),considered some of the best available science currently, provides conservation measures that are the basis for ESA consultation with US Fish and Wildlife Service. Measures applicable to this project are, in part:

- Maintain a mosaic of lynx habitat across LAUs.
- Design vegetation management to develop and retain dense horizontal cover.
- Do not reduce stem density through thinning, until stands no longer provide winter hare habitat.
- Retain mature multi-story conifer stands providing horizontal cover.
- No more than 30% of the habitat in an LAU is in early stand initiation structural stage or treated to remove horizontal cover (i.e. does not provide winter hare habitat.).
- When designing fuels reduction projects, retain patches of untreated areas of dense horizontal cover within treated areas.
- Management change of habitat on federal lands that creates early stand initiation structural stage or treated to reduce horizontal cover should not exceed 15% of lynx habitat on federal lands within a LAU over a 10-year period.

In addition, the LCAS notes that in drier forests adjacent to the boreal forest, fire suppression may have resulted in unnaturally dense fuels, and restoration of these communities may be desirable to reduce the risk of spreading frequent of severe fires into lynx habitat. This is the case in the project area.

The EMDS model does not consider lynx habitat. However, it does look at stand structures and vegetation types in the cold forest that lynx prefer. In the cold forest areas, the young forest multistoried structure and stem-exclusion single story structure are overrepresented, in comparison to historical levels, resulting in reduced diversity of habitat types across the landscape. Providing a mosaic of stand structures, including dense early-successional stands and mature multi-story coniferous stands that will produce winter snowshoe hare habitat over time, across the landscape, is important for lynx conservation.

Recommendations for the cold forest type from the EMDS analysis by Derek Churchill include reducing area and patch size in the young forest multi-storied stand type, and to a lesser extent, the stem-exclusion single story type, and reducing the area in subalpine fir types. However, there is limited opportunity to restore stand structures within the lynx habitat, due to topography, elevation, and the existing transportation system.

Approximately 2.6 miles of open road are located within the mapped lynx habitat in LAUswhich could result in disturbance or habitat disturbance.

Critical Habitat for Lynx

Approximately 12,890 acres within the project area are designated Critical Habitat for lynx. The Fish and Wildlife Service designated boreal (northern, high-elevation moist forests) forest landscapes providing a mosaic of forest structures as Critical Habitat. The primary constituent elements (PCEs) for critical lynx habitat are:

- the presence of snowshoe hares and lynx preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;
- winter snow conditions that are generally deep and fluffy for extended periods of time;
- sites for denning that have abundant coarse woody debris, such as downed trees and root wads;
- matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range (USFWS, 2009).

Critical Habitat consists of areas considered to be essential to the conservation of the species and which may require special management considerations or protection. Critical Habitat receives protection under section 7 of the Endangered Species Act, and agencies must ensure that any actions are not likely to result in destruction or adverse medication of Critical Habitat. Some of the activities that may affect Critical Habitat for lynx include actions that would remove understory vegetation in boreal forest on a large scale, actions that would result in loss or conversion of boreal forest on a large scale, and actions that would increase traffic volume and speed in lynx Critical Habitat. In matrix habitat, activities that change vegetation structure or condition would not be considered an adverse effect to Critical Habitat unless they would create barriers or impede lynx movement between habitat components.

In the North Cascades in Washington,most lynx occur above 4,101 ft and select Engelmann spruce-subalpine fir forest cover types in winter (Koehler et al. 2008, Maletzke, 2004). Lynx in this area avoid Douglas-fir and ponderosa pine forests, openings, recent burns, open canopy and understory cover, and steep slopes (Koehler et al. 2008).

Boreal forest in the project area is primarily confined to the western half of the LAUs. Critical Habitat is delineated along the northeast and southcentral ridgelines dividing the Libby watershed with watersheds to the north and south. These areas have some cold/cool forest habitat, but are generally warmer drier forest types that aren't providing quality lynx habitat or connections to other LAUs. This is not likely to change, given the warming climate. In the (non-Wilderness) project area, 12,890 acres are designated Critical Habitat for lynx. Approximately 4,604 acres are within the mapped lynx habitat. Early successional habitat is estimated at 853 acres, 7% of the Critical Habitat in the project area.

Approximately 9.9 miles of road are found in Critical Habitat, which could result in disturbance or habitat disturbance.

Resource Indicator:Change to Habitat for Sensitive and Focal Species

Northern Goshawk

Goshawks are a focal species that use stands with large trees, dense canopies, and high canopy closures for nesting. Goshawk nesting habitat is generally composed of mature and older forests (McGrath et al. 2003). In eastern Washington, nest stands typically have a relatively high number of large trees, high canopy closures (>50%), multiple canopy layers, and a relatively high number of snags and downed wood (Finn 1994, McGrath et al. 2003). Although old-growth characteristics are important to breeding goshawks, McGrath et al. (2003) found that old-growth stands were used for nesting only in proportion to their availability, while closed canopy stem exclusion stands were used more than expected based on availability.

Post-fledgling areas (PFAs) surround the nest area and are used by juveniles until they no longer depend on adults for food. PFAs provide hiding cover and foraging habitat for juveniles. PFAs consist of a variety of forest types and conditions, but in eastern Washington, were composed largely of structurally complex late-successional forests (McGrath, 1997). Hargis et al. (1994) found that foraging occurs in various cover types and structural stages and that the juxtaposition of several habitat types may enhance foraging.

Densely canopied stands with large trees suitable for nesting goshawks are found across the analysis area, and estimated at approximately 6,090 acres in Libby Creek (27% of non-Wilderness watershed in project area) and 6,932 acres in Buttermilk Creek (63%). Goshawks have been documented in the project area, although current surveys have not located active territories.

Goshawks cover large areas and use many habitats while foraging, and may be found across the project area. Approximately 34.8 miles of open roads are found in the potential habitat.

Gray Flycatchers

Breeding habitats for the gray flycatcher are shrub-steppe and open woodland. On the Okanogan-Wenatchee National Forest, habitat is scattered open ponderosa pine with bitterbrush and bunchgrass understories (Kent Woodruff, personal communication). In the central Washington Cascades, ponderosa pine trees within gray flycatcher territories are mid-successional size (mean dbh 11-13") (Altman and Woodruff, 2011). Nests are generally open-cups in trees or shrubs within a few meters of the ground, up to 20 meters, and nest-building and egg-laying occur in early to mid-June in Washington (Altman and Woodruff, 2011).

Habitat loss and alteration that reduces the amount or suitability of flycatcher habitat is the most likely threat to the gray flycatcher population (Altman and Woodruff, 2011) and recent changes in fire regimes threaten persistence of the primary habitat type for this species.

Recommendations for fuels reduction and thinning projects in gray flycatcher habitat, from the Conservation Assessment (Altman and Woodruff 2011) are:

- In thinning and/or fuels reduction projects in mid to late successional ponderosa pine forests:

1) maintain stand-level canopy cover in the 25-60% range with no areas <10% or >70%,
2) maintain stand-level shrub cover (i.e., shrubs and small trees that function as shrubs) < 20%, and
3) maintain stand-level herbaceous ground cover > 50% with some areas of bare ground.

- In early to mid-successional ponderosa pine forests (i.e., trees 15-25 centimeters dbh [6-10 inches dbh]) maintain small openings (i.e., 10-15 meters in diameter [33-49 feet in diameter) throughout the area.

Gray flycatcher habitat is abundant in the project area, in the hot/dry and warm/dry environmental zones and is estimated at approximately 21,743 acres. These two habitats comprise approximately 64% of the project area outside of Wilderness.

Gray flycatchers do not appear to be affected by use of roads and trails. However, Francis et al. (2009) found thatgray flycatchers nested significantly farther away from compressors at treatment sites than at control sites, suggesting avoidance of noise generated at work sites. That noise was much louder and of longer duration than that generated by motorized use of roads and trails. Francis et.al (2011) also found that flycatcher nest success was 7% higher at noisy sites, which reflected a decreased rate of predation in noisy areas. There are 45.3 miles of open roads in the potential habitat.

White-headed Woodpeckers

White-headed woodpeckers inhabit low-elevation dry forests, and are a focal species for dry forest management in the eastern Washington Cascade Range, as well as an R6 sensitive species. White-headed woodpeckers are most abundant in burned or cut stands with residual large live and dead pine trees (Raphael and White, 1984; Raphael et al., 1987). Many low-elevation dry forest species have been considered at risk due to the closing of dry forest canopies with fire exclusion, loss of large old ponderosa pine trees to logging, decline of herb and shrub understories from stand-canopy closure, and exclusion of low-intensity burns (Lehmkuhl et al., 1997; Wisdom et al., 2000).

Fuel reduction treatments that maintain or develop an abundance of mature pines that produce large cones with abundant seed (food) production, a moderately open canopy (50–70% cover), and the availability of snags and stumps for nest cavities (Garrett et al., 1996) would maintain or improve habitat for the species.

Approximately 64% of the project area is classified as dry forest habitat. In the south end of the project area, the Carlton ComplexFire burned about 800 acres in 2014 and will provide additional habitat. There are 45.3 miles of open road in the dry forest habitat.

The EMDS model was run for white-headed woodpecker habitat, and was modelled as ponderosa pine cover type with medium or large tree overstory of 30-40% canopy closure and elevations between 3,000’ and 4,000’.The EMDS model shows no current high-quality habitat for white-headed woodpeckers in the Buttermilk drainage. Potential habitat occurs across 2% of

the landscape, above historic levels which ranged from 0.01% to 0.3%. Other landscape metrics that have also changed. Largest patch is larger than historically. The mean patch sizeis slightly above historical levels and patches are closer currently than historically.

These metrics suggest that white-headed woodpecker habitat could be improved in the drainage. However, the amount of potential habitat is already over historical levels according to the EMDS model.

In the Libby drainage, the amount of current high-quality habitat for white-headed woodpeckers is within the historic range, although towards the lower end (range is 0.01-4.15%). Patch density, large patch index, and mean patch size are within HRV, although all towards the lower end of the range. Mean nearest neighbor value is below historical levels, which means that patches are closer than they were historically.

Based on these metrics and field verification, there is an opportunity to improve habitat for white-headed woodpeckers in the Libby drainage.

Stands with the highest priority for restoration of white-headed woodpecker habitat are stands with large pine that are overstocked and at risk from uncharacteristic disturbance or drought stress(Mellen-Mclean etal. 2013). Mid-seral ponderosa pine stands (60-100 years old) are a secondary priority for restoration treatment, with the objective to release medium sized trees to develop larger, older trees and resilient stands (Brown et al. 2004).

Dry forest restoration treatments will help restore habitat for white-headed woodpeckers. Restoration treatments in ponderosa pine forests in the eastern Washington Cascades had a positive effect on white-headed woodpeckers (Gaines et al. 2007, 2010). The retention of the large trees and snags and opening up of the overstory canopy through restoration treatments were likely important to the positive response to treatment by white-headed woodpeckers (Gaines et al. 2007).

Based on habitat use by white-headed woodpeckers, restoration of their habitat should include:

- retaining and producing large, older ponderosa pine trees used for foraging;
- retaining and creating large snags used for nesting;
- reducing shrub cover and excess down wood to reduce numbers of small mammal which prey on nests;
- reducing canopy density across the landscape to provide interspersion of open and closed pine stands;
- maintaining within stand heterogeneity;
- reintroduction of rust-resistant white pine or sugar pine where appropriate would provide an alternative winter food source.

Western Gray Squirrels

Western gray squirrels inhabit mast-producing conifer-hardwood forests throughout their range. In Okanogan County, gray squirrels use ponderosa pine and Douglas-fir stands, and adjacent riparian black cottonwoods (Linders and Stinson, 2007). Sites with more large (>15” dbh) trees may be better habitat because they provide more food, better cover, more cavities, and, often, interlocking crowns important for nest site security and arboreal travel.

Food supply is the most important variable regulating tree squirrel populations (Gurnell 1987). Gray squirrels feed on pine seeds, acorns and hypogeous fungi such as truffles, as well as

other seeds and fruits. In Okanogan County, pine seeds may be the most reliable food source (Linders and Stinson, 2007). Ideal foraging conditions may be a balance between open conditions that encourage pine seed production and clumping of trees allowing arboreal travel, secure nesting sites and patches of high canopy closure that produce abundant fungi (Linders and Stinson, 2007).

Nest trees are frequently conifers >15.8" dbh with dominant or codominant crowns and a marginal or interior stand location (Linders and Stinson, 2007). Cavities in cottonwoods or alder may be used for natal nests. Most nest trees have interconnected crowns (defined as <1 meter separation), although in Okanogan County, some trees had no connections and others one connection with adjacent trees. Variables that appeared to be the most important in selection of a nest tree in Okanogan County were mistletoe infection, large diameter, and connectivity. Most Okanogan nests were in ponderosa pine or Douglas-fir, although black cottonwood was also used.

Optimal habitat for gray squirrels would provide conditions suitable for foraging and nesting. Desirable characteristics include clumpy stands that would allow for arboreal travel with large ponderosa pines to provide seeds for food, with nest trees connected to other trees by interlocking crowns.

Approximately 64% of the project area is comprised of forested stands that could be habitat for gray squirrels, and they have been documented in the project area. Generally, lower elevation forested stands in the project area have the potential to provide adequate nest sites and ample potential for arboreal travel. Larger pines, and a variety of shrubs, produce seeds and berries for a diversity of food resources for squirrels. Red squirrels are abundant in the area and can be expected to compete for these foods.

Mortality by vehicles is a threat to squirrel populations, in addition to habitat loss and disease (Linders and Stinson, 2007). Approximately 45.3 miles of open roads are found in the habitat for western gray squirrels.

Resource Indicator: Change to Habitat for Management Indicator Species

Spotted Owls- see above

Winter Range for Mule Deer

Mule deer are a Management Indicator Species for winter range, and the Okanogan National Forest Land and Resource Management Plan contains standards and guidelines for winter range cover and access. Since the time that the Forest Plan was written, studies have found that thermal cover is not as critical as forage quality and quantity for winter survival of ungulates (Forest Restoration Strategy, 2012). Cook et al. (1998)concluded that their findings, combined with those of other thermal cover studies (e.g., Robinson 1960; Freddy 1986), offered strong evidence that influences of thermal cover on animal performance and, by extension, population dynamics was rarely of consequence. Cook et al. (2005) noted that there are tradeoffs between providing dense forest cover and providing forage resources, and concluded that cover is needed where security is low or where snow accumulations are factors limiting animal performance. Mysterud and Ostbye (1999) found that, although cover is important for habitat selection of temperate ungulates, there is no hard evidence that cover affects demography so much that it limits population growth in forested areas, and that there is no evidence that specific arrangements of food and cover areas confer any large advantage to deer. The Okanogan-Wenatchee Restoration Strategy suggests that emphasizing the reduction of road

density and enhancement of forage, can allow reduction in thermal cover while meeting the intent of standards for deer winter ranges, to resolve the potential conflict between restoring forests and winter range thermal cover.

Mule deer populations in Washington Department of Wildlife's Region 2, where the project is located, have experienced a gradual long-term decline in numbers which is attributed to reduced shrub diversity, declining productivity of aging shrubs and lack of recruitment of new shrubs due to fire suppression (Fitkin and Heinlen, 2012, 2015), rather than thermal cover. Herd growth has plateaued, and productivity and recruitment has fallen off as the herd reached 20-25,000 animals, which appears to be the landscape carrying capacity for deer (Fitkin and Heinlen, 2012). In 2014, wildfires burned about 40% of the winter range in the Methow watershed, including high density winter range areas (Fitkin and Heinlen, 2016). Additional large fires in 2015 continued this trend. Initial review indicates that much of the winter range in the area burned in the last 2 years and will likely impact the winter range carrying capacity for deer until shrubs reestablish and grow large enough to function as winter browse (Fitkin and Heinlen, 2016).

The current condition of thermal cover on the winter range in the project area is displayed below.

Figure 5: Cover on Deer Winter Range

	Current Condition		
Management Area	***Winter thermal cover***	***Snow-intercept thermal cover***	***total***
Standards & Guidelines	25%	15%	40%
MA-14	29%	22%	51%
MA-26	19%	16%	35%

These cover amounts are the result of fire suppression over the last century, which has led to increased acreages in denser stands that provide more thermal cover, and less forage than more open conditions. Dense stands are not a sustainable condition, and are at risk of mortality from insects, disease and wildfire.

Access: Road densities are displayed in the Transportation section. Open road density standards for deer winter range are 1 mile per square mile in MA-26 and 2 miles per square mile in MA-14. Road densities in the winter range land allocations for the project are below the maximum densities in each discrete management area. Approximately 23.5 miles of open roads are found in winter range in the project area, which could result in disturbance or habitat avoidance. However, the Forest roads are closed by snow during the critical winter period.

Lynx- see above.

Resource Indicator: Change to Habitat for Landbirds

Landbirds

Landbirds are an issue if habitat for the focal landbirds is present and would be affected by project activities. Direction for landbird conservation is provided by the Migratory Bird Treaty Act and Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds

and MOU 08-MU-1113-2400-264 Memorandum of Understanding between the U.S. Department of Agriculture Forest Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds.

Guidance for landbird conservation is provided by the Landbird Strategic Plan and The Conservation Strategy for Landbirds in Oregon and Washington (Altman 2000a, b, and Altman and Holmes, 2000).

Project area habitat has changed over the last century, and current stands are denser, more uniform, and have fewer large trees in comparison with historical forests (Franklin et al. 2008). In addition, fewer large snags are available due to firewood cutting and danger tree managment. This has resulted in a decrease in habitat quality in the project area for chipping sparrows and flammulated owls. The increase in density and multistoried habitat may have improved conditions for varied thrushes.

White-headed woodpeckers, gray flycatchers and goshawks have been discussed above.

Figure 6: Landbirds and Conservation Strategies

Species	***Conservation strategies***
Chipping sparrow (focal species for open understory)	Create open stand conditions and open understory with burning and thinning.
Flammulated owl (focal species for large snags)	Retain large snags. Open stands, but leave some thickets. Limit snag loss to firewood cutting.
Varied thrush (focal species for structural diversity)	Retain structurally diverse, multi-story conifer forest.
Brown creeper (focal species for large trees)	Retain large trees.
Ruffed grouse	Riparian and deciduous habitat
Yellow warbler	Riparian subcanopy foliage
Willow flycatcher	Dense riparian shrubs

Environmental Consequences

General effects of vegetation treatmentsare found in Appendix C.

Alternative 1 – No Action

Resource Indicator: Changes to Habitat for Threatened species

Spotted owls

If the no action alternative is implemented, stands would continue to increase in density, and fuel loadings would increase. Development of large trees that are important habitat elements for spotted owls, and limited in the project area, would be retarded by competition from the smaller trees. Competition would also result in mortality of the large trees, producing large snags, which are also important habitat elements. The few dense multistoried stands currently providing marginal owl habitat would be at elevated risk from high intensity wildfire due to abundant ladder fuels, which could carry fire into the crowns. High severity wildfire alters the forest structure associatedwith spotted owl nest and roost sites: high canopy closure,large-live tree basal area, and total live-tree basal area (Gaines etal., 1997; Roberts, 2008; Bond et al., 2009). (Low to moderate severitywildfires may have little or slightly positive impacts on spottedowls (Bond et al., 2002; Roberts, 2008; Bond et al., 2009).

In the short-term, current NRF and dispersal habitat would not be degraded or downgraded with implementation of the no action alternative and habitat fragmentation would not increase. In the long-term, stands would not become NRF or dispersal habitat as quickly, (if at all) in comparison to the action alternative. There would be no short-term effect. The long-term effect of the no-action alternative would be a neutral effect to habitat, because of the increased risk of habitat loss through wildfire and slowed development of large tree habitat used as nesting structures balanced by increased stand densities, which provide better habitat for owls.

Lynx and Critical Habitat

If the no action alternative is selected, the lynx habitat in the LAUs and in critical habitatwould remain the same in the short-term, and increase in stand densities and tree size, over time. If disturbance is absent, over time, the stand initiation stage stands would grow into stands of larger size trees not providing concentrated hare forage. Open-canopied stands with understories providing hare foods would eventually become less open, and understory forage would be reduced. This would reduce the prey base for lynx, and reduce capability of the LAU and Critical Habitat to support lynx. This would have a small adverse effect in the long-term in lynx habitat, because there are few units proposed in boreal habitat and a larger adverse effect (long-term) in critical habitat, because critical habitat was designated in drier forest types as well as boreal forest.

Resource Indicator: Changes to Habitat for Sensitive Species

Northern Goshawk

If the no action alternative is implemented, over time, denser stands would develop, and areas with high canopy closures and large trees would provide suitable habitat for goshawks. However, because goshawks use a more open understory, increased densities in the understory could be detrimental. Large trees, snags and down wood, important for nests and prey habitat would develop more slowly due to competition, and would be at higher risk than in the action alternative, due to wildfire and insect activity. The no action alternative would have mixed effects in the long-term- the understory would become denser and potential nest trees would develop more slowly, and these would be at higher risk for fire and insect activity, which is a negative effect to goshawks, but the overall canopy closures would also increase, providing more habitat for goshawks.

Gray Flycatcher

Fire suppression has resulted in higher stand densities and reduced understory vegetation, resulting in a reduction in habitat suitability for gray flycatchers. The no action alternative would continue this trend. As forest canopies close, understory shrubs would be shaded out, and

fewer nesting opportunities would exist. Implementation of the no action alternative would result in long-term moderate adverse effects due to increased stand densities.

White-headed Woodpecker
Implementation of the no action alternative would result in higher stand densities and increased canopy closures, resulting in a reduction in habitat suitability for white-headed woodpeckers. In the long-term, the large ponderosa pines used for nesting would be at a higher risk from wildfire, due to the presence of ladder fuels. Competition from smaller trees would result in mortality of the large pines, which would reduce nesting opportunities. Implementation of the no action alternative would result in long-term moderate adverse effects due to increased stand densities.

Western Gray Squirrels
With implementation of the no action alternative, stand densities would continue to increase, providing increased arboreal travel and fungi foods. Competition on large pines from smaller trees would slow their growth, and reduce production of seeds, which are an important winter food source. Mortality due to vehicle strikes would continue on 45.3 miles of open roads. Implementation of the no action alternative would result in long-term mixed effects due to increased stand densities and reduced growth of large pines.

Resource Indicator: Habitat for Management Indicator Species

Spotted Owls- see above.

Winter Range for Mule Deer
Implementation of the no action alternative would allow stand densities to continue to increase, providing more thermal cover and less forage for mule deer. This would result in an overall decline in the ability of the winter range to support mule deer over time. Implementation of the no action alternative would result in long-term moderate adverse effects due to a reduction in forage species.

The no-action alternative would result in road densities being maintained at current levels. The proposed action would close and decommission roads, resulting in reduced action and higher quality habitat for mule deer. Implementation of the no action alternative would result in long-term minor adverse effects due to road effects in comparison with the action alternatives.

Lynx- see above.

Resource Indicator: Changes to Habitat for Landbirds

If the no-action alternative is selected, denser stand conditions would be maintained, reducing habitat quality for species using open stands (chipping sparrow, white-headed woodpecker, gray flycatcher), large trees (spotted owl, goshawk, brown creeper) or large snags (flammulated owl) and improving habitat availability for species preferring dense stands and smaller trees (varied thrush). Degraded riparian habitats would be maintained in their current condition, resulting in poor quality habitat for species using riparian habitats (yellow warbler, willow flycatcher, ruffed grouse). No road decommissioning would occur, resulting in continued snag loss, disturbance, habitat avoidance, and access-related mortality. Implementation of the no action alternative would result in mixed effects to landbirds. There would be a long-term moderate adverse effect to landbirds that prefer open stands, and a long-term moderate beneficial effects to species preferring denser conditions. There would be a long-term moderate adverse effect to landbirds resulting from roads and road use.

Alternative 2 – Proposed Action

Project Design Features and Mitigation Measures

Figure7: Design Features

Number	Design Feature	Why Necessary	Efficacy	Consequence of Not Applying
General 1	In harvest units, retain complex patches, clumpiness and canopy gaps in accordance with the Forest Restoration Strategy.	To provide cover, diversity, connectivity and variety of food resources.	High	Reduction in diversity across landscape, ability of some species to disperse across area and fewer food sources.
General 2	In fuels and pre-commercial thin units, retain unthinned patches of trees from 0.1 to multiple acres.	To provide cover, diversity, connectivity and variety of food resources.	High	Reduction in diversity across landscape, ability of some species to disperse across area and fewer food sources.
General 3	In fuels units, retain the complex patches, clumpiness and gaps retained in the harvest units.	To provide cover, diversity, connectivity and variety of food resources.	High	Reduction in diversity across landscape, ability of some species to disperse across area and fewer food sources.
Spotted Owl 1	Limit diameter of large trees cut under trees in stands providing NRF habitat, to 21" dbh. Retain snags and defective trees.	To balance reducing competition on large trees with retaining large trees and canopy closures in NRF stands. Canopy closures and medium/large trees will be reduced but stand will become better NRF in the future, and risk of high severity wildfire reduced.	High	Habitat would be degraded or downgraded to dispersal or no habitat.
Goshawk 1	If nests are found prior to contract award, nest stands and post-fledgling area (PFA) will be delineated and managed by retaining high canopy closures, diversity of stand structures, and large overstory trees.	Protect active nest and fledgling areas.	High	Reduction in suitable habitat which could result in reduced carrying capacity for sensitive species.

Goshawk 2	Timing restrictions on activities in the nest stand and PFA from March through August.	Reduce disturbance to goshawks.	High	Potential for nest abandonment by adult, and subsequent loss of young of a sensitive species.
Western Gray Squirrel 1	Retain denser forest in riparian areas and in clumps and patches across the landscape. In fuels and harvest units, retain groups of trees with interlocking canopies and more open areas to balance fungal and mast crop production. Provide stringers of trees with interlocking crowns between natal nest sites, forage areas, and water.	Facilitate arboreal travel to reduce predation by ground-based predators. Provide variety of food sources.	High	Increased mortality of a sensitive species and reduced variety of foods.
Mule deer 1	In fuels units, retain areas of dense multistoried canopy cover across 15-20% of the fuels treatment footprint in patches from 0.1 acre to multiple acres.	To provide thermal and hiding cover.	High	Reduced diversity, connectivity, and food resources across the landscape for deer and other wildlife species.

Figure 8: Mitigation Measures

Number	Mitigation	Why	Efficacy	Consequences	Monitoring Required
Spotted owl 1	Timing restrictions from March 1 to August 1 in unsurveyed areas where adequate NRF present.	Reduce potential for disturbance to spotted owls.	High	Protect nest	No
Goshawk 1	If nests are found after contract award, major project activities should be avoided from the onset of nesting until the young are fledged (mid-August).	Reduce potential for disturbance to nesting goshawks.	High	Protect nest	Yes

Western Gray Squirrel 1	If natal nests are found, buffer with 50' no-cut zone, retain 50% or greater canopy closure within 350' of nest.	To protect nest sites and reduce potential of mortality to young.	Unknown	Protect nest	Yes
Western Gray Squirrel 2	Avoid disturbance between March 1 and August 31 within 400' of natal nests.	Reduce potential for nest abandonment.	High	Protect nest	No

Effects

Figure9: Resource Indicators and Measures for Alternative 2

Resource Element	Resource Indicator	Measure	Existing Condition (Alternative 1)	Alternative 2
Habitat for threatened species- spotted owls, lynx, and Critical Habitat for lynx.	Changes to Spotted Owl Habitat	Nesting, Roosting, Foraging habitat (NRF) Open roads in habitat	1,054 acres 15.7 miles	1,022 acres (-3.0%) 17.2 post-project
	Changes to Lynx habitat in LAUs	Early successional habitat-acres treated Open roads in habitat	Spirit Mountain-300 ac. Methow Gold-206 ac. 2.6 miles	Spirit Mountain-5 ac.(2%) treated 50 ac. (41%) Treated 2.6 mi. post-project
	Changes to Critical Habitat for lynx	Acres of designated habitat with treatments Open roads in CH	12,890 acres total CH 9.9 mi.	2,137 acres treated (17%) 15.7 miles post-project

Habitat for sensitive species- goshawk	Changes to Suitable habitat	Goshawk- dense stands with large trees. Open roads	13,022 acres (38% of non-Wilderness project area) 34.8 mi.	11,712 acres (34% of non-Wilderness project area) 40.2 post-project
Habitat for sensitive species- gray flycatcher, white-headed woodpecker and western gray squirrel.	Changes to Suitable habitat	Suitable habitat improved (ac.) Open roads (mi.)	21,743 acres of potential habitat (64% of non-Wilderness project area) 45.8 mile total	1,962 acres of potential habitat improved. (9% of the habitat) 51.4 post-project
Habitat for MIS, winter range, mule deer	Spotted owls Change to Winter range Lodgepole pine	See above Cover:forage ratios Open roads See above	MA 14: 52% cover (SIT-22%, WT-29%) MA 26: 35% (SIT-16%, WT-19%) 23.5 mi.	MA 14: 33% cover (SIT-10%, WT-24%) MA 26: 33% (SIT-16%, WT-17%) 21.0 post-project
Habitat for landbirds Ponderosa pine Mixed conifer Riparian/deciduous	Changes to habitats.	Potential habitat treated	Ponderosa pine- 21,743 acres. Mixed conifer- 12,643 acres. Riparian- 3,412 acres Deciduous- 430 acres	Ponderosa pine- 8,426 acres treated (39%) Mixed conifer- 1,817 acres treated (14%) 628 acres (plus 40 acres aspen) (20%) Deciduous (aspen) 286 acres

*Decommissioned roads noted here are open roads that would be decommissioned, and does not include roads that are currently closed that would be decommissioned.

Resource Indicator: Changes to Habitat for Threatened species

Spotted owls
In east-side habitats of the Washington and Oregon Cascade Range, the only viable conservation strategy is to actively manage fire-prone forests and landscapes to sustain spotted owl habitat (Forest Restoration Strategy, 2012). The proposed treatments in the action alternatives would achieve this, and are consistent with the revised recovery plan for spotted owls (USFWS, 2011), by treating primarily areas that are not currently providing habitat, to better protect habitat from large scale, high-severity fires and to set appropriate stands (which are very limited in the analysis area) on a trajectory to become habitat in the future. Suitable habitat in the analysis area is inadequate to support owls, and marginal due to small isolated stands on the edge of the range. Two of those stands (32 acres) would be thinned to retain the large tree component, while retaining adequate canopy closure to function as NRF.

Disturbance from noise and human presence could occur during implementation of all treatments, particularly those using heavy equipment and chainsaws. Surveys were completed in areas where NRF habitat was concentrated, with no responses from spotted owls.

Silvicultural treatments:

In NRF
The table below displays the extent of the silvicultural treatments for alternative 2 in suitable owl habitat (NRF).

Figure 10: Silvicultural Treatments in Spotted Owl Habitat (NRF)

Prescription	***NRF (acres)***
Dry Forest with mistletoe sanitation	3*
Dry Forest Restoration	1*
Moist Forest Thin	32
Post and Pole	0
Regeneration	0
Total	***32***

*Mapping errors to be resolved, no actual NRF loss.

Moist forest treatments would occur in 32 acres (3%) of marginal NRFhabitat for spotted owls. Treatment prescriptions for this type would limit size of understory trees that would be cut around the largest trees, to 21” dbh, and retain snags and defective trees.

Silvicultural treatments that change the overstory in owl habitat would open the canopy and slightly degrade NRF habitat. This would be a minor (32 acres), short- to medium-term (1-10 years), negative effect to the habitat, followed by a minor long-term beneficial effect (because the treatments would retain large trees on the landscape, and reduce risk of fire and insect activity).

In Dispersal Habitat
Approximately 515 acres of dispersal habitat would be thinned (about 11% of the dispersal habitat), which would open the canopy and slightly degrade this habitat type. This includes treatments that remove mistletoe infections, which produce deformed branches often used for nesting. This treatment is planned for 127 acres in dispersal habitat (3% of the dispersal habitat). In the short-term,this would decrease nest site availability in stands that may become habitat in the future, while improving growth on remaining trees in the longer term. (These

treatments do not occur in stands currently providing suitable (NRF) habitat.) Regeneration harvest would occur on 56 acres of dispersal habitat (1%), which would downgrade the habitat to non-habitat.

The amount of dispersal habitat for spotted owls would be reduced by silvicultural treatments in the short and medium term, probably for a minimum of 10 years, (until the medium and large trees released from understory competition grow enough to provide a high canopy closure).This would make the project area even less suitable for spotted owls than it is already. There would be a moderate (11%degrade/downgrade of dispersal habitat), adverse effect to dispersal habitat in the short-to medium term.Approximately half of this reduction would occur in the northeastern portion of the analysis area, where dry forest conditions interspersed with non-forest habitat adjacent to private land and the eastern edge of the owl's range, make this area a poor candidate for managing as owl habitat. In the longer term, accelerated growth of large trees would occur more quickly than if left unmanaged, providing better habitat over time for spotted owl and other species using large trees.

Silvicultural treatments would also result inmoderate beneficial effects to the dispersal habitat, in the short and longer term (immediately to >20 years). Release of large and medium trees would reduce competition on the remaining trees, accelerating their rate of growth into larger trees. It would also reduce the ladder fuels that could carry fire from the ground into the canopy, and reduce risk of losing the stands of large trees. This would improve habitat at the individual stand and at the landscape level for spotted owls.

In all prescriptions except regeneration harvest (56 acres of the 4,112 acres of dispersal, 1%), NRF and dispersal stands will retain some habitat function as foraging habitat, post-treatment. Habitat would be slightly degraded for flying squirrels (Lehmkuhl et al. 2006b, Carey, 2001) but habitat for woodrats and other prey (Lehmkuhl et al. 2006a), would be retained or would rapidly recover functionality (in less than 5 years)(Irwin et al. 2012), and would provide a food source for owls. Variable thinning, which is planned for the project, is expected to be favorable compared to even-aged thinning because it creates within stand heterogeneity (Carey 2001, Lehmkuhl et al 2006). Carey found that, post- variable thinning, total biomass of squirrels was enhanced within 5 years. This would provide additional food for owls.

Ladder fuel treatments: Research suggests that thinning and burning treatments in dry coniferous forests have few detrimental effects on native understory vegetation (Forest Restoration Strategy, 2012). Ladder fuel thinningthat affects the understory would have minor effects on the NRF and dispersal habitat. Understory fuels less than 8" dbh would be cut, piled and burned. These contribute little to canopy closures and are too small to provide shading, habitat for prey species or cover from predators. Removal of this component would reduce competition and risk of fire to the larger trees. Ladder fuel thinning would occur in less than 1 acre of NRF habitat and about 2,004 acres of dispersal habitat (about ½). However, ladder fuel reduction (LFR) in non-habitat stands would result in reduced risk of crown fire across the landscape, which would protect existing owl habitat, as well.

*Prescribed burning:*Prescribed burning has less effect on overstory than thinning, and usually doesn't reduce tree density or basal area of the dominant overstory (Forest Restoration Strategy, 2012). Patchiness, structural complexity and habitat heterogeneity increase with prescribed burning, (unless there are multiple entries or burn is large (greater than 1000 hectares)(Pilliod, 2006)). Prescribed burning with low/moderate prescriptions would have minor negative effects on owl habitat in the short- to medium term (1-10 years). It would result in slightly more open canopies, loss of large, soft snags, and creation of small, hard snags.

Beneficialeffects would be increased diversity of structures and increased complexity of habitats which would increase foraging opportunities in about 5 years.

Fireline construction by machine and hand would be completed to support burns. None of the machine firelines are in suitable (NRF) habitat, but several are adjacent. Surveys have been completed and no responses were elicited from spotted owls.

Road actions: No temporary roads would be built in suitable (NRF) habitat. Several closed roads (ML 1) would be opened. While 2.4 miles would be opened, only 0.5 would be open to public use. The remainder would be open to administrative use, which is infrequent. Decommissioning of closed and open roads, opening of closed roads for administrative use, and changes in maintenance levels would occur, and could result in short-term disturbance to owls. There would be mixed effects to owls- a short-term minor adverse effect could occur during road actions (decommissioning, opening, closing), amoderate intensity, long-term benefit would occur, as decommissioned roads would eventually revegetate, possible providing additional habitat in 40 years or more.

Minor vegetation changes could occur as a result of the decommissioning or reopening, if small trees and shrubs are removed on the road bed.

Surveys have been completed and no responses were elicited from spotted owls.

*Soils treatments:*Soil treatments would occur in 28 acres of NRF and 21 acres of dispersal habitat. The tree component would not be changed, and this treatment would not change habitat function. Timing restrictions would not be required, as surveys have been completed and spotted owls were not found. Disturbance to owls in the area, but undetected by surveys, could occur.

Wetland treatments:These treatments occur outside of suitable owl habitat, however, disturbance to adjacent habitat could occur. No timing restrictions were required, because surveys were completed in these areas, and no spotted owls were found.

Aquatic Projects: Vegetation effects would be minor for these projects, and large trees would not be affected. Timing restrictions for fish protection on the culverts would prevent disturbance to nesting owls season, as well.

Overall, considering all project components, the project would have minor (to NRF habitat) to moderate (dispersal habitat) short-term to medium-term (1-10 years), mixed effects for spotted owl habitat, and long-term moderate beneficial effects (because fire/insect activity risk would be reduced across landscape, and stands would be more likely to have large tree habitat suitable for owls). There is currently not enough habitat in the project area to support owls.

Determination: Alternative 2 may affect, but is not likely to adversely affect spotted owls. The area doesn't have enough habitat to support nesting owls currently. The limited suitable habitat is avoided in treatments, except for 32 acres which would be thinned to retain the largest trees. Surveys of the habitat concentrations have not elicited responses from spotted owls.

For owls as MIS- this alternative would have a small short-term negative impact, as vegetation treatments affect 3% of the current suitable, but unoccupied, habitat. Treatments across the landscape would accelerate the growth of large trees more suitable for owl habitat, and would reduce risk of large-scale fire on the habitats. The loss of unoccupied habitat and short-term disturbance would be insignificant at the Forest scale. The Mission project is consistent with the

Forest Plan, Northwest Forest Plan, Forest Restoration Strategy and Revised Recovery Plan for the Northern Spotted Owl.

Lynx

Figure 11: Treatments in LAUs

Treatments in LAUs in Lynx Habitat	
	acres
Aspen	5
Pre-commercial thinning	50
Total	***55***

*Silvicultural and fuels treatments:*Approximately 1,770 acres of treatment would occur in the LAUs in the analysis area. However, only 55 acres occur within the boreal forest area where lynx are expected. In the Methow Gold LAU (Libby drainage), 50 acres of pre-commercial thinning (in plantations) would occur in stands that are typed as stand-initiation phase. Five acres of aspen understory treatmentwould occur in the Spirit LAU (Buttermilk).These stands have grown out of reach of hares and are no longer providing a food resource. All overstory treatments would result in more open habitat that will generate browse for hares, an important prey item for lynx. This effect would occur rapidly after overstory change (1 to 10 years (Pilliod, 2006)), and persist until shrubs and tree limbs grow out of reach of hares. Slash would be hand-piled.

Soils treatments, Wetland treatments: These are not proposed in the LAUs.

Fisheries and aquatics projects: Several projects aimed at improving aquatic habitat condition are proposed in alternative 2, and are located in lynx habitat in the LAUs. Installation of culverts, coarse wood and beaver dam analogs would result in short-term noise and human presence in lynx habitat. Disturbance could occur, but lynx do not appear to be particularly sensitive to human presence (Staples, 1995; Mowat et al. 2000). Minor vegetation effects could occur where heavy equipment is used, but this would be limited in extent and would not reduce vegetation foods for snowshoe hare and other lynx prey species. Timing of the work would prevent disturbance to den sites.

Road construction and decommissioning: No temporary road construction is proposed in the LAUs. Other road actions are proposed in alternative 2, and would result in temporary noise and human presence in the short-term, during implementation. Disturbance could occur, but lynx do not appear to be particularly sensitive to human presence (Staples, 1995; Mowat et al. 2000), nor to avoid roads (McKelvey et al., 2000, Kolbe et al. 2006, Squires et al. 2010). Ruggiero et al (2000) Ruediger et al. (2000). Squires et al. (2010) reported that lynx denned further from roads than random expectation, but did not think that was related to human disturbance, but rather related to fewer roads in the mature forests.

Roads are a source of mortality for lynx (Ferreras et al. 1992, Kramer-Schadt et al 2004). Lynx are also vulnerable to overexploitation from trapping (Bailey et al. 1986). Access for trapping is increased by the presence of roads and trails. However, lynx are a threatened species, and no legal trapping is allowed.

The only road actions would occur in the lynx habitat within the LAUs are decommissioning of already closed roads. These actions would result in reduced potential for disturbance to lynx prey.

Overall, considering all project components, there would be a minor (because it involves only 55 acres in boreal forest), short- to medium term, beneficial effect to lynx habitat, because hare forage would increase.

Determination: Alternative 2 may affect, but is not likely to adversely affect lynx. Treatments are very limited in the mapped lynx habitat (55 acres), and would increase understory growth that provides cover and forage for prey species. Alternative 2 is consistent with the LCAS. It doesn't reduce stem densities through thinning until stands no longer provide winter hare habitat.

For lynx as MIS- This alternative would slightly improve conditions for lynx in the project area. The Mission project would not contribute to a negative trend in viability on the Forest.

Critical Habitat for Lynx: Approximately 2,137 acres would receive silvicultural or fuels reduction treatments with implementation of alternative 2. Overstory and understory treatments in critical habitatare displayed below. See silviculture and fuels sections for treatment definitions.

Figure 12: Overstory Treatments in Lynx Critical Habitat

Overstory Treatments in Critical Habitat	
	acres
Aspen	80
Dry forest/mistletoe sanitation	112
Dry forest restoration	11
Moist forest thin	15
Regeneration	19
Total	***236***

Figure 13: Understory Treatments in Lynx Critical Habitat

Understory Treatments in Critical Habitat	
	acres
Aspen_understory	26
Aspen- girdle	8
Ladder fuel reduction (LFR)	1,663
Timber stand improvement (TSI)	421
Whip-felling	19
Total	***2,137***

Most treatments are not in the mapped lynx habitat zone. Treatments in lynx habitat are discussed above, in the "Lynx" section. The mapped lynx habitat has the best potential for lynx use, and use has been documented. The critical habitatdesignation also includes some areas that have been mapped as cool/dry or cool/cold mesic habitat.Treatments that are not in the mapped lynx habitat but are in a cool/dry or cool/cold habitat type that could have some boreal forest types, are as follows:

Figure 14: Overstory Treatments in Cool/dry and Cool/cold mesic Zones

Overstory treatments in Cool/dry and Cool/cold mesic zones Outside of Mapped Lynx Habitat	
	Acres
Aspen	21
Dry forest/mistletoe sanitation	18
Moist forest thin	15
Regeneration	1
Total	***55***

Figure 15: Understory Treatments in Cool/dry and Cool/cold mesic Zones

Understory treatments in Cool/dry and Cool/cold mesic zones Outside of Mapped Lynx Habitat	
	Acres
Aspen_understory	21
Ladder fuel reduction	915
Timber stand improvement	277
Whip-felling	1
Total	***1,214***

*Silviculture treatments (overstory):*Silvicultural treatments would open the canopy and result in increased understory vegetation, which would be beneficial to hares and other lynx prey. This would continue until the overstory closes again. Depending on how open the stands are, post-treatment, this effect could last for a decade or more. This would still be a minor improvement in understory vegetation, since only 37 acres would be thinned in the potential habitat. The dry forest/mistletoe sanitation treatment occurs, as the name suggests, in drier forest types.

*Fuels and understory treatments:*Ladder fuel reduction and whip-felling could affect understory structure and reduce food availability for hares. Shrubs are not cut in these treatments, but small trees could provide some food resources for hares and other prey, although many trees are suppressed and lacking branches, or branches are too high for hares to reach. Timber stand improvement stands are plantations, provide limited cover, and have grown out of reach of hares. That leaves about 937 acres of thinning that could result in some browse loss for hares, distributed across the cool/dry and cool/cold mesic zones, in about 12 individual polygons. A general mitigation in fuels treatments is to leave unthinned patches of trees from 0.1 to multiple acres and to retain the complex patches, clumpiness and gaps retained in the harvest units. This will provide cover and forage for hares. Because understory vegetation is not limited across the critical habitatunit, the treatments are not expected to reduce hare forage or populations. Prey for lynx in this marginal habitat would be maintained.

*Road actions:*Approximately 0.04 miles of temporary road would be built in critical habitat, and result in a minor amount of vegetation loss. Approximately 0.3 miles of open road and 6.6 miles of closed roadwould be decommissioned.No closed roads would be opened. These actions would have minimal effects on vegetation, depending on how long the roads have been closed and other factors. Decommissioned roads may revegetate in the long-term to provide some habitat for lynx or their prey.

Other actions: No soil treatments or wetland thinning is planned in critical habitat. Fisheries projects- coarse wood placement in streams and culverts of stream crossings, would occur. These projects would not change vegetation or effect critical habitat.

Overall, considering all project components, there would be a minor (because it involves only 55 acres in boreal forest), short- to medium term, beneficial effect to critical habitat, because hare forage would increase.

Overall, considering all project components, there would be a, short- to medium term, beneficial effect to lynx habitat, because hare forage would increase.

Determination: Alternative 2 may affect, but is not likely to adversely affect critical habitatfor lynx. Only 55 acres of treatment would occur within the boreal forest area mapped as lynx habitat. These stands have grown out of reach of hares and are no longer providing a food resource. All overstory treatments would result in more open habitat that will generate browse for hares, an important prey item for lynx. Alternative 2 is consistent with the LCAS. In the remainder of the critical habitat, treatments would not result in large-scale loss of understory vegetation in boreal forest. The area is mostly **not** boreal forest, and treatments in the cooler, moister types are limited and dispersed across the area.

Resource Indicator: Change to Habitat for Sensitive Species

Northern Goshawk
Surveys for goshawks were limited, and no territories were identified. If nests are located prior to contract award, the nest territory would be protected. If found during contract activities, timing restrictions would protect the active nest.

*Silvicultural and fuel treatments:*Treatments that open the overstory would make the stands less suitable for use by goshawks for nesting in the short-term. Foraging use may still occur, and opening the stands would create structural diversity and a potential increase in prey availability and diversity. Loss of snags as danger trees during logging would occur.

Ladder fuel reductions (LFR) would benefit goshawks by reducing understory density and reducing risk of fire and insect activity which could destroy nest stands and post-fledgling areas. LFR would remove a smaller size class of trees than the commercial thinning, which would result in little opening of the canopy. Loss of snags used for nesting or prey habitat would also occur. Timber stand improvement (TSI) thinning would occur in plantations of small trees that are not providing habitat for goshawks or prey. In the longer term, thinning would increase structural diversity and diversify prey habitat across the stand, and accelerate growth into larger trees that may become habitat for goshawks. Underburning would result in some loss of snags and large down wood, particularly soft snags, although some hard small snags would also be produced. The proposed actions would move stand structures toward mature and old forest structure, provide a variety of canopy closures and stand conditions, and result in a less uniform horizontal structure across the landscape, and would potentially improve habitat conditions for goshawks and their prey in the long-term over the current condition.

Riparian habitat with dense deciduous vegetation that would provide habitat for important prey items such as ruffed grouse and hares would be retained by use of riparian buffers. Some canopy opening through fuels treatments would stimulate deciduous vegetation that would improve habitat quality for grouse. In addition, aspen treatments would occur on 286 acres (66% of the deciduous habitat) and would retard the encroachment of conifer species on the aspen stands, which will perpetuate and increase the size of the aspen stands.

Reynolds et al. (1992) and Squires and Reynolds (1997) recommended prescribed fire and thinning from below to achieve non-uniform spacing of trees, with a maximum of 30-50% canopy opening, to sustain habitat for the northern goshawk and their prey. However, these recommended canopy closures are higher than historical conditions for the dry forest, and would preclude thinning and harvest options. Retention of clumps, patches, and riparian buffers, would result in denser conditions that would help to mitigate the overall reduction of overstory canopy. This is a component of the silvicultural prescriptions.

Post-harvest, assuming all overstory treatments result in open canopies that would not support nesting goshawks in the short-term, approximately 34% of the landscape would remain as potential habitat for goshawks. This is a 4% loss of habitat across the project area. Nest habitat does not appear to be a limiting factor in this landscape, and the proposed treatments would increase prey diversity and availability, accelerate growth into better habitat, and help to protect current habitat from fire, while protecting and retaining the largest size class trees.

Road actions: Approximately 0.2 miles of temporary road would be built in goshawk habitat. This could remove a small amount of habitat, a maximum of 0.7 acre if all the area is timbered. Approximately 34% of the analysis area would still be habitat. Public access would not be permitted on temporary roads, so they would not increase access for falconers. Other road actions would not produce measurable change in vegetation. Decommissioning of currently open roads would occur on 1.6 miles in goshawk habitat, which would access for falconers. However, 1.9 miles of closed road would be reopened for public use, so a net increase in access of 0.3 miles would occur.

Other projects: None of the other project proposals would result in measurable changes to vegetation in goshawk habitat.

All proposed projects have the potential to disturb nesting goshawks that have not been detected. If territorial goshawks are observed, a biologist would attempt to locate the nest site, and timing restrictions would be imposed.

Overall, considering all project components, there would be minor, mixed, short- to long-term effects to goshawk habitat.About 4% of the habitat would be treated.

Determination: Alternative 2 may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Habitat would be reduced by 1,510 acres, 4% of the analysis area. Approximately 11,712 acres would remain as potential habitat. A net increase in access of 0.3 miles would occur, which could increase access for falconers, as well as increase disturbance from noise and human access.

Gray Flycatcher

Silvicultural treatments would occur in 1,962 acres (9%) of the potential gray flycatcher habitat.

The proposed treatments (harvest, thinning, ladder fuel reduction, prescribed fire) would result in more open habitats across the project area. Post-harvest stand level canopy cover is expected to be above 25%, with the exception of the regeneration harvests on 79 acres, (approximately 0.4% of the project area), which are predicted to be 10%. However, to provide for a diversity of habitat types and species, prescriptions would emphasize clumps and gaps, so areas <10% and >70% canopy closure would be present, post-project. Fuels treatment units would retain 20% of the area in an untreated condition, to provide hiding cover and thermal cover for deer, and to meet habitat needs of gray flycatchers and other species.

Research suggests that thinning and burning in dry forest have few detrimental effects on native understory vegetation, and that the understory is largely unchanged several years after the treatment (Forest Restoration Strategy 2012).In the short-term, stand-level shrub cover would be changed by prescribed burning, and effects from prescribed burning are expected to be patchy. Shrub cover would be reduced in small areas of heavy fuel loadings, but overall effects of the prescribed burning are expected to be low-severity. Some loss of shrub component would occur during underburning, but abundant shrub cover would remain to provide habitat for this species. In the longer term, burning would increase the amount and quality of shrub habitat.

Thinning of the densely canopied stands would improve habitat for gray flycatchers. These heavily-stocked stands are not currently good habitat. Thinning would reduce stand density and open the canopy, possibly enough to produce an understory component of shrubs that may provide nest or forage habitat and would increase overall understory richness.

Because the treatments would result in patchy effects, it is difficult to predict how much habitat would be improved for gray flycatchers as a result of treatments. However, approximately 1,882 acres of hot dry or warm dry environmental types are proposed for treatments that would potentially result in conditions that are not too open or too densely canopied for gray flycatcher use. This is about 9% of the total hot dry/warm dry environmental type in the project area. Harvest, thinning, burning and treatment of ladder fuels could have a short-term disturbance effect, but would reduce fuel loadings to protect remaining habitat. Abundant structure for nests and foraging would remain across the lower elevations used by gray flycatchers.

*Road actions:*There would be a net increase of 1.2 miles of open roads during project implementation, and 6.1 miles post-project in this habitat type, which could affect flycatchers.

Other projects: None of the other project proposals would result in measurable changes to vegetation in hot dry or warm dry vegetation types.

All proposed projects have the potential to disturb nesting birds, if the project occurs during that time.

Overall, considering all project components, there would be minor, negative, short-term effects to gray flycatcher habitat due to activity disturbance, minor amounts of shrub loss, and increased road densities during the project. There would be a long-term, moderate, beneficial effect on 9% of the habitat, due to creation of more open habitat types and reduced fuel loadings/fire risk, and a minor adverse effect due to increases in open roads.

Determination: Alternative 2 may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Vegetation treatments would have a beneficial impact on gray flycatchers. The project would reduce stand densities and increase availability and quality of shrub habitat. However, a

smallnet increase in open roads in this habitat type could have a long-term negative effect. Because these roads are not heavily used, this negative effect would likely be minor. Mechanical treatments could also cause a short-term disturbance effect.

White-headed woodpecker
Thinning and burning in dry forest stands would improve habitat for the white-headed woodpeckers by reducing competition and ladder fuels around large pines, which would accelerate development of large trees and increase the availability of seeds. Trees larger than 21" dbh would generally not be cut and would remain on the landscape to provide foraging habitat and, in time, large snags for nesting. The harvest treatments would provide additional stumps for nesting.

Because the treatments would result in patchy effects, it is difficult to predict how much habitat would be improved for white-headed woodpeckers. However, 1,882 acres (9% of the total hot dry/warm dry environmental type) are proposed for treatments that would potentially result in improved conditions for white-headed woodpecker use.

Harvest, thinning, burning and treatment of ladder fuels could have a short-term disturbance effect, but would reduce fuel loadings to protect remaining habitat.

Road Actions: Opening of 2.4 miles of currently closed roads in potential habitat would lead to snag loss on as much as 116 acres.This would reduce nesting and foraging habitat for white-headed woodpeckers. Approximately 2.2 miles of currently open roads would be decommissioned, which would offset the potential snag loss on a maximum of 107 acres.

Other projects: None of the other project proposals would result in measurable changes to vegetation in hot dry or warm dry vegetation types.

All proposed projects have the potential to disturb nesting birds, if the project occurs during that timeframe.

Overall, considering all project components, there would be a moderate (9% of the habitat), long-term beneficial effect from vegetation treatments and a minor, long-term adverse effect on snag habitat.

Determination: Alternative 2 may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Vegetationtreatments would have a beneficial impact on white-headed woodpeckers. Tree growth would be accelerated by removal of competing smaller trees, and potential for large-scale habitat loss through catastrophic wildfire would be reduced. However, a net increase of 0.2 miles of open roads would result in loss of snags on about 9 acres. Overall, the proposed project would improve conditions for white-headed woodpeckers in the project area and would not contribute to a negative trend in Forest-wide viability.

Western Gray Squirrels
Silviculture and fuels treatments: Effects from harvest and fuels treatments on gray squirrels are mixed. Harvest and fuels treatments may result in loss of nests and potential nest sites (generally trees >15.8" dbh), would fragment the tree canopy that squirrels use for travel and escape cover, and would reduce abundance of fungi foods. Nest site loss is expected to be minimal because trees > 21" would rarely be cut, and known natal nests would be protected. Thinning prescriptions would provide for retention of clumps of trees, which would provide opportunity for arboreal travel. Some loss of cavity habitat that would provide potential nest

sites would occur with harvest and burning. Because nests are usually in the larger size class trees, it is unlikely that noncommercial or ladder fuel reduction thinnings would affect nests.

Underburning would remove some surface fuel which may reduce escape cover for squirrels moving along the ground. However, burning is generally patchy and larger down wood is not generally consumed. Thinning would increase food resources by accelerating growth of large ponderosa pines (which produce more pine seeds than small trees (Linders and Stinson, 2007), and also by opening of the tree canopy, which would allow the development of a shrub understory and additional foods. All fuels treatments would help to protect occupied and potential gray squirrel habitat from effects of uncharacteristic wildfire.

Road actions: Approximately 1.2 miles of temporary road would be opened for logging useand could result in additional mortality from vehicle strikes due to logging traffic. Temporary road construction would result in a maximum loss of vegetation of 4.1 acres, which would reduce availability of cover and potential for arboreal travel. Post-harvest, open road decommissioning would occur on 2.2 miles in western gray squirrel habitat. However, other road changes would result in anet increase of 6.2 miles of open roads in this habitat post-project including 2.4 miles of currently closed road that would be opened to general use.

Other projects: None of the other project proposals would result in measurable changes to vegetation in hot dry or warm dry vegetation types.

All proposed projects have the potential to disturb squirrels. This would be a short-term effect during project implementation.

Overall, considering all project components, there would be moderate (30% of habitat affected), mixed effects to western gray squirrels in the long-term.

Determination: Alternative 2 may adversely impact individuals through loss of arboreal travel opportunities or nests and potential for mortality from vehicle strikes during logging, but is not likely to result in a loss of viability in the project area, nor cause a trend toward federal listing. Effects would occur on 10,256 acres, about 30% of the project area. Post-project, open road mileage would increase, increasing risk of mortality from vehicle strikes. Alternative 2 would decrease the risk of large-scale habitat loss from wildfire.

Resource Indicator: Habitat for Management Indicator Species

Spotted Owls- see above.

Winter Range for Mule Deer

*Silvicultural and fuels treatments:*There are approximately 1,022 acres in harvest units and 3,231 acres of ladder fuel reduction treatments that would occur on deer winter ranges. Approximately 557 acres, in 12 units would be logged during the winter.

The proposed action would reduce thermal cover and increase forage for mule deer. The table below displays the cover remaining after treatments, and was modeled assuming that the harvest treatments would remove all thermal cover within the unit. The assumption for the LFR units (outside of the harvest areas) was that approximately ½ of the seedling/sapling and post/pole-size component within the unit would be removed in the ladder fuel reduction treatments.

Figure 16: Estimated Post-treatment Thermal Cover, before mitigation

Alternative 2						
Management Area	***Winter thermal cover***		***Snow-intercept thermal cover***		***total***	
	acres	*%*	*acres*	*%*	*acres*	*%*
MA-14	2,611	24%	1,054	10%	3,665	33%
MA-26	200	17%	185	16%	385	33%

The total cover remaining across the winter range would be approximately 33% in each management area. To mitigate cover post-treatment levels below Forest Plan standards, and to provide for adequate cover distribution across the project area (and to increase diversity and provide connectivity and habitat elements for other wildlife species), each ladder fuel reduction unit would leave 20% of the area untreated, in patches from 0.1 acre to multiple acres in size.

The canopy reduction from harvest and fuel treatments would result in an increase in forage species. Underburning would also result in increases in availability and palatability of forage species, as the older woody vegetation is burned and new vegetation growth is stimulated. However, it is important that patches of dense cover of at least 0.1 acres be retained to provide hiding cover for mule deer (Germaine et al, 2004).

Disturbance could occur as a result of winter logging, and deer may be temporarily displaced from the area being logged. The Forest winter range is higher elevation than the more heavily used areas on private land that are lower elevation and have less snow. Winter logging standards call for frozen ground and a minimum snowpack of 8“ of compacted snow, to protect soils. By the time this amount of snow has accumulated, deer have often moved to lower elevations where food is more available. Anecdotal information suggests that deer may remain in units being logged in the winter to forage on lichens and fir needles from logged trees.

Road actions: Approximately 1.2 miles of temporary road would be constructed in winter range, open for logging use, then decommissioned. This would result in minor loss of vegetation for the short-term (less than 5 acres) until the vegetation regrows. Shrub species that may provide browse for deer may grow back within 5 years of decommissioning. Approximately 0.03 mile of closed road would reopen to general use on winter range, however the roads would still be closed by conditions during the winter period.

Decommissioning of currently open roads would occur on 2.2 miles. In the short and longer term, decommissioning of open roads would reduce access disturbance to deer, mortality from collisions, hunting and poaching and avoidance of habitat. Eventually, vegetation would regrow and provide additional browse.

Other actions: Other proposed projects would cause short-term, temporary disturbance to deer during project implementation, but involve only minor vegetation change. No measurable changes to cover or forage for deer are expected.

Overall, considering all project components, there would be moderate (occurring on 8% of the winter range) short- to long-term mixed effects on winter range for mule deer. Forage would be increased in the short and longer term, but cover would be reduced, although adequate cover would still remain. Road decommissioning on winter range would be a minor, long-term beneficial effect.

Lynx- see above.

Resource Indicator: Change to Habitat for Landbirds

The effects of forest restoration treatments on landbirds have been studied in several research projects. Gaines et al. (2007) found that dry forest restoration treatments implemented using the range of variation to guide forest thinning and burning, increased overall avian density and the overall density of neotropical migrants. There were positive density responses from several species that have been identified as species important to managers, including white-headed woodpeckers (which were only found in the treated stands) and chipping sparrows. Their results suggested that two aspects of the restoration treatments were important contributors to positive species responses: retention of the large tree component and creation of a more open overstory canopy.

Bagne and Purcell (2010) found that low-severity prescribed fires applied in spring served to drive the bird community towards pre-suppression conditions. Positive effects were found for riparian associate species, aerial foragers, and bark foragers.

Prescribed fire reduces populations of ground and shrub nesting birds (Wilson et al. 1995, Artman et al. 2001, Blake 2005), while benefiting populations of woodpeckers (Blake 2005, Russell et al. 2009) and species that forage in the air and on the ground (Saab et al. 2007, Russell et al. 2009).

Fuel reduction treatments that change stand structure or composition would cause some species to gain habitat and others to lose (Lehmkuhl et al. 2007). The table below displays the expected effects for these focal species.

Figure 17: Summary of habitat conditions and effects from fuels and vegetation treatments

Species	Direct and Indirect Effects	Conclusion
Chipping sparrow (focal species for open understory)	Stands would become more open with more ground foraging opportunities on approximately 39% of the pine habitat in the project area.	Beneficial effect for chipping sparrow .
Flammulated owl (focal species for large snags)	Bigger trees over time and reduced potential for fire loss would improve habitat on about 39% of the pine habitat in the project area.	Beneficial effect for Flammulated owls. Combination of leave areas and thinning create improved habitat in dry forest.
Varied thrush (focal species for structural diversity)	Stand structure would become more open and have fewer canopy layers as a result of treatments, over 14% of the habitat type. Mitigations of retaining 20% of fuels units in clumps and patches would retain habitat for the species.	Treatments would reduce habitat suitability for varied thrushes, but retained clumps and patches, and riparian buffers would leave a minimum of 20% of the area untreated. 86% of the mixed conifer habitat in the project area would remain in the current condition.
Brown creepers	Bigger trees over time and reduced potential for fire loss would improve habitat on about 39% of the mixed conifer in the project area.	Beneficial effect for brown creepers.
Ruffed grouse	Approximately 286 acres of aspen habitat would be maintained by removal of encroaching small conifers and girdling of large conifers that are shading the aspen stands. This would allow stands to grow larger.	Beneficial effect for ruffed grouse.

Yellow warbler and willow flycatcher	Limited treatments would occur in riparian habitats that would affect vegetation. Some fuel treatments and harvest would occur at the outer edges of the riparian reserves, and could result in increases in availability of shrub habitat, reduce susceptibility to fire and accelerate growth of large trees. 58 acres of dry forest thinning, 86 acres of TSI, 462 acres of LFR and 22 acres of wetland thinning would occur in the riparian. Wetland thinning would retard conifer encroachment.	Possible slight benefit for yellow warbler and willow flycatcher.

Other proposed actions would result in short-term disturbance. Riparian projects would improve riparian habitat conditions and reduce disturbance in the long-term.

Overall, there would be a moderate, long-term beneficial effect for species utilizing more open conditions and a moderate, long-term adverse effect for species preferring higher canopy closures and denser stand conditions.

Cumulative Effects

Geographic boundary: The geographic boundary is the project area, unless otherwise stated. The two drainages are sufficient in size to address effects to most species. Lynx geographic boundaries are the LAUs, and critical habitat. For deer and winter range, the geographic area is the winter range in the project area.

Temporal boundary: The temporal boundary is the last 100 years, since fire suppression began in the National Forests, to 20-40 years into the future, when the project's effects to vegetation would no longer be in evidence.

Past Actions
Fire-suppression and preferential logging of large trees have changed the character of forested stands from open, single-storied patches of large pioneer species, to dense multi-storied stands. This has led to a loss of structural and compositional heterogeneity and a predominance of young dense and relatively homogenous forest (Knapp et al 2013). It has also led to accumulation and continuity of forest fuels which have contributed to large and more severe wildfires, which are projected to become even more common as the climate continues to warm (Westering et al 2006). Fewer large snags occur compared to historical conditions, due to loss of large trees (fewer to become snags and down wood), firewood cutting and danger tree cutting.

Road construction has resulted in habitat loss and increased access, which increases potential for disturbance, habitat avoidance, loss of snags through firewood cutting and danger tree management, mortality from collisions, hunting/poaching, trapping, and collecting.

On-going Actions
Fire-suppression, danger tree cutting and firewood cutting are on-going in the project area, contributing to increases in stand densities and loss of snags. Road maintenance, weed treatments, and grazing are also occurring. Road maintenance and weed treatments may add noise disturbance. Grazing may alter vegetation, reducing the grass/forb component and reducing competition around small trees.

Reasonably Foreseeable Future Actions
Nofuture vegetation projects have beenidentified.The Travel Management decision, due to be final in December 2016, would close ML 1 roads (closed roads) to all vehicles, including OHVs, and would close the Forest to off-road motorized travel.

In general, the effect of implementing Travel Management, would be reduced disturbance and habitat avoidance to species sensitive to noise and human presence. Some vegetation change may occur as a result of closure of the forest to off-road motorized use, which would allow vegetation to regrow in areas that have received motorized use. This is expected to be minor across the project. ML 1 roads are closed to firewood cutting, so substantial increases in snag levels are not expected when these roads are closed to OHVs. OHV speeds on these primitive and unmaintained ML1 roads is slower than on open forest roads, and mortality to wildlife from vehicle strikes is not expected. Closure of ML 1 roads to OHVs would reduce motorized access for hunting and trapping. While hunting and trapping would still occur, it is less likely when access is more difficult.

Cumulative Effects Summary
Past actions have resulted in denser forest conditions, with fewer snags and large trees, and increased access to the project area.

The Travel Management decision will reduce access by motorized vehicles and the associated disturbance and habitat avoidance.

*Spotted owls and goshawks:*For spotted owls and goshawks, results of past and on-going management have been mixed. Fire suppression resulted in dense stand structures more suitable for nesting. Logging, however, reduced numbers of large nest trees. On-going firewood cutting is reducing snags that provide nesting structures and habitat for prey for both owls and goshawks. Proposed road decommissioning will reduce this effect. Proposed vegetation actions would return a portion of the project area to the more open structures that were present prior to fire suppression. This would help to maintain the remaining large trees, protecting them from competition and wildfire. The cumulative effect is that the area is less suitable for owls, but probably neutral for goshawks, since abundant dense habitat will remain.

*Lynx and Critical Habitat:*In the higher elevations used by lynx, fire suppression has reduced the early-successional component used by their primary prey- snowshow hare, and reduced the landscape diversity. The proposed action would reduce potential for extensive severe wildfires and slightly increase diversity in the lynx habitat, partially counteracting past actions.

Travel management actions in conjunction with Mission roads actions are not likely to have much of an effect on lynx, because lynx are not particularly disturbed by human presence, and vegetation changes in critical habitatare likely to be minor.

White-headed woodpeckers and Gray flycatchers: Fire suppression has allowed development of dense stands and a more homogeneous landscape, which made the area less suitable for these species. The proposed vegetation actions would counteract this effect on about 9% of the habitat.

Travel management actions would not overlap effects from Mission road actions for white-headed woodpeckers because the most likely effects of road closures and decommissioning on

this species are increased snag levels. Closure of ML 1 roads to OHVs resulting from Travel Management would not affect snag levels.

Western gray squirrel: Denser stands resulting from fire suppression have likely produced better habitat for squirrels, because more opportunities for avoiding predators through arboreal travel are available. Proposed vegetation activities would open stands, possibly reducing arboreal travel, on 1,962 acres. Silvicultural prescriptions for leaving clumps and gaps would mitigate this to some extent.

Road changes from the Travel Management project would not change the potential for mortality to squirrels because they close ML 1 roads to off-road vehicles, which are travelling at lower speeds and not likely to strike squirrels. There is no overlap between Travel Management and the Mission project for this species.

Winter range: Fire suppression has allowed stand densities to increase over time, resulting in more cover and less forage for deer. The proposed vegetation management would counteract this and result in more forage, less cover and more sustainable conditions over about 43% of the winter range in the project area.

The Travel Management project applies to non-winter motorized use only. There is no overlap between it and the Mission roads actions for wintering deer.

Landbirds: Ponderosa pine habitats have become denser and less fire-resistant as a result of long-term fire suppression. Snag levels have been reduced by firewood cutting. Loss of snags and large trees and denser, more uniform forest structure has reduced habitat quality for flammulated owls and chipping sparrows. The proposed actions would open the stands on about 39% of the project area, counteracting this effect on 8,426 acres. This would improve habitat for chipping sparrows and flammulated owls. However, a net increase in open roads would occur, and result in additional snag loss. Travel management does not affect snag levels and firewood cutting, thus there is no overlap in effects for snag-associated species.

Mixed conifer habitats have also become more dense, reducing growth of trees and subjecting large trees to increased competition from smaller trees. Increasingly dense stands aregood habitat for varied thrushes. The proposed actions would restore more open conditions and reduce the risk of wildfire and insect outbreaks, thus partially counteracting past logging and fire suppression. This would reduce habitat for varied thrushes on about 14% of the mixed conifer habitat.

Logging of large trees reduced suitability of this habitat type for brown creepers. Proposed vegetation actions will accelerate growth of large trees and reduce risk of wildfire and mortality from competition, countering the past actions on 39% of the mixed conifer habitat in these drainages.

Riparian habitats have been degraded by past logging and road construction. Road decommissioning (of open roads) would reduce disturbance, habitat avoidance and potential for mortality, for a wide variety of species. This would be a small countereffect, as only 0.7 miles of open road would be decommissioned in riparian reserves. Decommissioning of open or closed roads would allow habitat to recover and would counteract effects of previous construction over time. This would occur on 8.8 miles in the riparian reserves. This would be beneficial for ruffed grouse, yellow warblers, willow flycatchers and other riparian associated species.

Deciduous habitats have changed over time, due to fire suppression. The project will counteract that effect on the 266 acres of aspen where treatments would open the conifer overstory and allow aspen to establish. Fire suppression is on-going, so conifer encroachment can be expected to continue. Effects of the treatment would probably last several decades and would be beneficial to ruffed grouse, who use deciduous habitats for foraging. Travel management could improve riparian habitats, by closing them to off-road motorized use.

There are no reasonably foreseeable future plans for vegetation management at this time. The Travel Management project would change management of ML1 roads, and potentially cause a cumulative effect with road actions from this project, which could affect western gray squirrels, deer and other species that are sensitive to road effects. However, ML 1 roads are currently open only to off-highway vehicles (OHVs). OHVs are not likely to kill squirrels or other wildlife species, due to lower vehicle speeds, or affect snag levels, since ML 1 roads are closed to firewood cutting.

Figure 18: Resource Indicators and Measures for Cumulative Effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2 (Units)	Past, Present, and Future Actions (Units)	Cumulative Impacts (Units)
Habitat for threatened species- spotted owls	Open roads in habitat	Miles	17.2	17.2	+1.5
Habitat for threatened species- lynx	Open roads in habitat	Miles	2.6	2.6	+0.0
Habitat for threatened species- Critical Habitat for lynx	Open roads in CriticalHabitat	Miles	15.7	15.7	+5.8
Habitat for Sensitive Species- goshawks	Open roads in habitat	Miles	40.2	40.2	+5.4
Habitat for Sensitive Species- Western Gray Squirrel, white-headed woodpeckers, gray flycatchers.	Open roads in habitat	Miles	51.4	51.4	+6.1
Habitat for MIS- Winter Range	Open roads in habitat	Miles	21.0	21.0	-2.8

Resource Indicator: Changes to Habitat for Threatened Species

Figure19: Habitat for Spotted Owls Cumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	Yes	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance and habitat avoidance. OHV use on closed roads in suitable habitat is likely to be minor in this area, and there is no indication of owls in the project area.

Figure 20: Habitat for Lynx and Critical HabitatCumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	Yes	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance, habitat avoidance and access-related mortality. OHV use on closed roads in lynx habitat and critical habitatis likely to be minor in this area. ML 1 roads in lynx habitat are limited. Lynx do not appear to be sensitive to human presence.

Resource Indicator: Habitat for Sensitive Species

Figure21: Habitat for Sensitive SpeciesCumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management - general	Yes	Yes	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance, habitat avoidance and access-related mortality.
Goshawks	Yes	Yes	No	Access for falconers would be reduced by road decommissioning and closures of ML1 roads to all motorized vehicles. However, the extent of use of this area by falconers is unknown. No goshawks were found during surveys.
Gray flycatchers	Yes	Yes	No	Effects to this species is probably limited.
White-headed woodpeckers	Yes	No	No	Effects to this species would be from changes in snag levels, which would occur in the Mission project from open road decommissioning. No effects on snags would occur from the Travel Management project.
Western gray squirrels	Yes	No	No	Mortality to western gray squirrels is the primary effect of open roads on this species, and would be reduced due to road decommissioning and closures in the Mission project. Travel management would close ML1 (currently closed) roads to OHVs. However, slower speeds used by OHVs on primitive roads would make it less likely that squirrels would be hit.

Resource Indicator: Habitat for MIS

Figure 22: Habitat for MIS- Winter Range Cumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	No	No	Travel management does not make decisions on winter road use, so there is no overlap with winter range for mule deer.

Alternative 3

Effects

See Alternative 2 for effects of vegetation treatments. These are the same for both alternatives.

All other projects except for rock armouring and road actionswould be the same as in alternative 2.

Rock armouring occurs only in alternative 3, and would potentially cause noise disturbance, which would be short-term in nature. Vegetation effects would minimal. No substantial effects to any wildlife species are expected, and these will not be discussed further.

Across the analysis area, the following road actions would occur in alternative 3:

Temporary road construction	1.2 miles
Decommissioning of open roads	6.1 miles
Decommissioning of closed roads	51.0 miles

These actions would have a net beneficial effect for wildlife. Fewer roads mean less access for firewood harvest, hunting, trapping, poaching and collecting, reduced avoidance of suitable habitat and less disturbance from motorized vehicles and human presence. As vegetation returns to the roadbed, additional forage and cover would be produced. Short-term disturbance would occur during decommissioning and road construction. Road construction would remove 4.1 acres of habitat across the project area.

In general, alternative 3 would have more beneficial effects to wildlife in the long-term than alternative 2, because it decommissions more roads.

Figure 23: Resource Indicators and Measures for Alternative 3 (Road actions only)

Resource Element	Resource Indicator	Measure	Alternative 3
Habitat for threatened species-spotted owls	Open roads in habitat	Miles	12.7
Habitat for threatened species-lynx	Open roads in habitat	Miles	2.6
Habitat for threatened species-Critical Habitat for lynx	Open roads in habitat	Miles	9.8
Habitat for sensitive species-goshawks	Open roads in habitat	Miles	28.0
Habitat for sensitive species-Western gray squirrels, white-headed woodpeckers and gray flycatchers	Open roads in habitat	Miles	34.5
Habitat for MIS-Winter range	Open roads in habitat	Miles	12.2

Spotted Owls

No temporary roads would be built in suitable (NRF) habitat. Approximately 1.4 miles of roads would be decommissioned in suitable habitat, which could result in short-term disturbance to owls. Only one segment is a currently open road, 0.03 miles. The other roads are closed and in various stages of revegetation. Approximately 0.9 miles of closed road would be reopened for administrative access, which is generally infrequent. Habitat concentrations have been surveyed, with no responses from spotted owls. It is unlikely that the analysis area has sufficient habitat to support owls currently.

A long-term benefit would occur, as decommissioned roads would eventually revegetate, possibly providing additional foraging habitat in 20 years or more.

Overall, considering all project components (vegetation, aquatics and roads), the project would have minor (to NRF habitat) to moderate (dispersal habitat) short-term to medium-term (1-10 years), mixed effects for habitat, and long-term moderate beneficial effects (because fire/insect activity risk would be reduced across landscape, and stands would be more likely to have large tree habitat suitable for owls). There is currently not enough habitat in the project area to support owls.

Determination: Alternative 3 may affect, but is not likely to adversely affect spotted owls. The area doesn't have enough habitat to support nesting owls currently. The limited suitable habitat is avoided in treatments, except for 32 acres which would be thinned to retain the largest trees. This habitat would be degraded, but not downgraded. No roads would be built in suitable habitat, but 1.4 miles of open roads would be decommissioned, which would reduce disturbance to owls. Surveys of the habitat concentrations have not elicited responses from spotted owls.

For owls as MIS- this alternative would have a small negative impact, as vegetation treatments affects 3% of the current suitable, but unoccupied, habitat. Treatments across the landscape would accelerate the growth of large trees more suitable for owl habitat, and would reduce risk of large-scale fire on the habitats. The loss of habitat and short-term disturbance would be insignificant at the Forest scale. The Mission project is consistent with the Forest Plan, Northwest Forest Plan, Forest Restoration Strategy and Revised Recovery Plan for the Northern Spotted Owl.

Lynx and Critical Habitat

No temporary roads would be constructed in lynx habitat. Approximately 0.6 mile of closed road would be reopened for public use, and 1.5 miles for administrative use. Approximately 2.6 miles of currently closed roads would be decommissioned with implementation of alternative 3. This would probably have a minimal effect on lynx, as they are not particularly disturbed by human presence, are not hunted or trapped (since they are a sensitive species) and with one exception near Buttermilk Butte, these roads are not likely to receive much OHV use due to vegetation, length, and lack of interesting destination. In the long term, decommissioned roads will revegetate, producing forage and cover for prey species. This would be a minor effect on about 9 acres, from about 5 years after decommissioning, if roads are not already vegetated and will be ripped or subsoiled, to 30 or 40 years or more, when tree species would grow out of reach by hares.

Temporary avoidance of the sites could occur during implementation.

In critical habitat,0.04 miles of temporary road would be constructed, and 1.6 miles of open road would be decommissioned. Temporary road construction would remove less than 1 acre of habitat. Decommissioning would result in revegetation over time, which could provide more cover and forage for hares and other prey on less than 6 acres. This is a minor effect covering only 0.05% of the critical habitat. No closed roads would be reopened.

Overall, considering all project components, there would be a short- to medium term, beneficial effect to lynx habitat and critical habitat, because hare forage would increase.

Determination: Alternative 3 may affect lynx (due to short-term disturbance to prey) but is not likely to adversely affect lynx. Den sites are not likely to be disturbed, as sites (both road

decommissioning and vegetation treatment units) are generally not accessible during the early season when denning occurs.

For lynx as MIS- This alternative would slightly improve conditions for lynx in the project area. The Mission project would not contribute to a negative trend in viability on the Forest.

For Critical Habitat, the determination is “may affect, but is not likely to adversely affect critical habitatfor lynx”. Only 55 acres of treatment would occur within the boreal forest area mapped as lynx habitat. These stands have grown out of reach of hares and are no longer providing a food resource. All overstory treatments would result in more open habitat that will generate browse for hares, an important prey item for lynx. Alternative 3 is consistent with the LCAS. In the remainder of the critical habitat, treatments would not result in large-scale loss of understory vegetation in boreal forest. The area is mostly not boreal forest, and treatments in the cooler, moister types are limited and dispersed across the area. Road actions in critical habitatare limited to 0.05% of the habitat.

Goshawks
Open roads provide access for falconers, which may result in loss of nestlings. Alternative 3 would decommission 4.1 miles of currently open road, which would make access more difficult.

Overall, considering all project components, there would be minor, mixed, short- to long-term effects to goshawk habitat. About 4% of the habitat would be treated. Additional road decommissioning in alternative 3 (compared to alternative 2) would result in a long-term, moderate, beneficial effect for goshawk habitat.

Determination: Alternative 3 may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Habitat would be reduced by 1,510 acres, 4% of the analysis area. Approximately 11,712 acres would remain as potential habitat. Approximately 4.1 miles of open road would be decommissioned, reducing access for falconers.

Gray flycatchers
Open roads may affect gray flycatchers.However, no specific information was found on the response of gray flycatchers to roads. Noise effects have been documented, but at much higher levels than would occur with use of forest roads.

Overall, considering all project components, there would be minor, negative, short-term effects to gray flycatcher habitat due to activity disturbance, minor amounts of shrub loss, and increased road densities during the project. There would be a long-term, moderate, beneficial effect on 9% of the habitat, due to creation of more open habitat types and reduced fuel loadings/fire risk, and a possible minor adverse effect due to increases in open roads.

Determination: Alternative 3 may adversely impact individuals, but is not likely to result in a loss of viability in the project area, nor cause a trend toward federal listing.

White-headed Woodpeckers

Decommissioning of open roads would be beneficial for woodpeckers and snag-associated species because it would reduce snag loss from firewood collection and danger tree management. This would occur on 6.1 miles. Temporary roads would not be open for public use, so no firewood collection should occur. Some danger tree management could occur and result in snag loss. This is likely to be minor. Approximately 0.1 mile of currently closed road would be opened, which would result in snag loss.

Overall, considering all project components, there would be a moderate (9% of the habitat), long-term beneficial effect from vegetation treatments and road decommissioning.

Determination: Alternative 3 would have a beneficial impact on white-headed woodpeckers. Tree growth would be accelerated by removal of competing smaller trees, snag loss would be reduced, and potential for large-scale habitat loss through catastrophic wildfire would be reduced. The proposed project would improve conditions for white-headed woodpeckers in the project area and would not contribute to a negative trend in Forest-wide viability.

Western Gray Squirrel

Approximately 1.2 miles of temporary road would be constructed in habitat for gray squirrels, open for logging use, then decommissioned. This would result in increased potential for squirrel mortality from vehicle strikes and a minor loss of vegetation for the short-term (less than 5 acres) until the vegetation regrows. Shrub species that may provide cover or forage may grow back within 5 years of decommissioning.

Decommissioning of currently open roads would occur on 6.1 miles. In the short and longer term, decommissioning of open roads would reduce access and disturbance to squirrels, mortality from vehicle strikes, and avoidance of habitat. Eventually, vegetation would regrow and provide additional cover and forage. Disturbance to squirrels and avoidance of habitat could occur during decommissioning, but would be temporary and short-term. Approximately 0.1 mile of currently closed road would be opened, which would result in vehicle traffic and potential loss of squirrels through vehicle strikes.

Overall, considering all project components, there would be moderate (30% of habitat affected), mixed effects to western gray squirrels in the long-term.

Determination: Alternative 3 may adversely impact individuals through loss of arboreal travel opportunities or nests and potential for mortality from vehicle strikes during logging, but is not likely to result in a loss of viability in the project area, nor cause a trend toward federal listing. Effects would occur on 10,256 acres, about 30% of the project area. Post-project, open road mileage would decrease, due to the decommissioning of roads. Alternative 3 would increase habitat resilience to severe, large-scale wildfire, protecting it into the future.

Winter Range

Approximately 1.2 miles of temporary road would be constructed in winter range, opened for logging use, then decommissioned. This would result in minor loss of vegetation for the short-term (less than 5 acres) until the vegetation regrows. Shrub species that may provide browse for deer may grow back within 5 years of decommissioning. Deer may be displaced during use of the temporary roads. However, logging would occur in a limited area at any one time, and road use would be short-term. This would mitigate effects to deer.

Decommissioning of currently open roads would occur on 6.1 miles. In the short and longer term, decommissioning of open roads would reduce disturbance to deer, mortality from collisions, hunting and poaching and avoidance of habitat. Eventually, vegetation would regrow and provide additional browse. Disturbance to deer and avoidance of habitat could occur during decommissioning, but would be temporary and short-term.

Approximately 0.3 miles of closed road would be reopened, and could result in disturbance, displacement, access for hunting and potential for collisions with deer.

Overall, considering all project components, there would be moderate (occurring on 8% of the winter range) short- to long-term mixed effects on winter range for mule deer. Forage would be increased in the short and longer term, but cover would be reduced, although adequate cover would still remain. Road decommissioning on winter range would be a minor, long-term beneficial effect.

Figure 24: Resource Indicators and Measures for Cumulative Effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 3 (Units)	Past, Present, and Future Actions (Units)	Cumulative Impacts (Units)
Habitat for threatened species-spotted owls	Open roads in habitat	Miles	12.7	12.7	-3.0
Habitat for threatened species-lynx	Open roads in habitat	Miles	2.6	2.6	+0.0
Habitat for threatened species-Critical Habitat for lynx	Open roads in CriticalHabitat	Miles	9.8	9.8	-0.1
Habitat for Sensitive Species- goshawks	Open roads in habitat	Miles	28.0	28.0	-6.8
Habitat for Sensitive Species- Western Gray Squirrel, white-headed woodpeckers, gray flycatchers.	Open roads in habitat	Miles	34.5	34.5	-10.8
Habitat for MIS-Winter Range	Open roads in habitat	Miles	12.2	12.2	-11.6

Resource Indicator: Changes to Habitat for Threatened Species

Figure25: Habitat for Spotted Owls Cumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	Yes	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance and habitat avoidance. OHV use on closed roads in suitable habitat is likely to be minor in this area, and there is no indication of owls in the project area.

Figure 26: Habitat for Lynx and Critical HabitatCumulative Effects

Project	Overlap In Time Space		Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	No	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance, habitat avoidance and access-related mortality. OHV use on closed roads in lynx habitat and critical habitatis likely to be minor in this area. ML 1 roads in lynx habitat are limited. Lynx do not appear to be sensitive to human presence.

Resource Indicator: Habitat for Sensitive Species

Figure27: Habitat for Sensitive SpeciesCumulative Effects

Project	Overlap In Time	Space	Measurable Cumulative Effect?	Extent, Detectable?
Travel management - general	Yes	Yes	No	Travel management would close ML 1 roads to OHV use and close the forest to off-road motorized travel, which would reduce disturbance, habitat avoidance and access-related mortality.
Goshawks	Yes	Yes	No	Access for falconers would be reduced by road decommissioning and closures of ML1 roads to all motorized vehicles. However, the extent of use of this area by falconers is unknown. No goshawks were found during surveys.
Gray flycatchers	Yes	Yes	No	Effects to this species is probably limited.
White-headed woodpeckers	Yes	No	No	Effects to this species would be from changes in snag levels, which would occur in the Mission project from open road decommissioning. No effects on snags would occur from the Travel Management project.
Western gray squirrels	Yes	No	No	Mortality to western gray squirrels is the primary effect of open roads on this species, and would be reduced due to road decommissioning and closures in the Mission project. Travel management would close ML1 (currently closed) roads to OHVs. However, slower speeds used by OHVs on primitive roads would make it less likely that squirrels would be hit.

Resource Indicator: Habitat for MIS

Figure 28: Habitat for MIS- Winter Range Cumulative Effects

Project	Overlap In Time	Space	Measurable Cumulative Effect?	Extent, Detectable?
Travel management	Yes	Yes	No	Travel management does not make decisions on winter road use, so there is no overlap with winter range for mule deer.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

The action alternatives comply with Executive Order 13186 (because they restore habitat for migratory birds to more historical conditions with silvicultural, fuels and wetland treatments),Okanogan Forest Plan (with amendments for deer cover and old growth habitat), Northwest Forest Plan (develops old-growth forest characteristics), Recovery Plan for Northern Spotted Owl (emphasizes vegetation management treatments outside of spotted owl core areas or high value habitat), the Forest Restoration Strategy (retains legacy structures while restoring

spatial patterns and maintaining spotted owl habitat), and theLynx Conservation Assessment and Strategy (doesn't cut current early successional stands that have hare forage value).

Summary

Spotted owls, lynx, critical habitatfor lynx, goshawks, gray flycatchers, white-headed woodpeckers, western gray squirrels, mule deer (Management Indicator Species for winter range) and landbirds are considered in detail in the Wildlife Specialist report and biological assessment (threatened and endangered species only).

Vegetation treatments are the same in both alternatives, and restore habitat conditions and reduce risk of catastrophic disturbance on 6% of the project area through silvicultural treatments. Risk of fire is reduced on another 24% of the project area through fuels treatments.

It is likely that fire suppression resulted in better habitat for spotted owls than would have otherwise have existed in the area, because the forests became denser. However, past logging of large trees degraded that habitat. Currently, the project area does not have enough habitat to support owls.Suitable nesting, roosting, foraging habitat would be further degraded on 3% of the habitat, by thinning which would reduce canopy closures.Vegetation treatments would retain large trees, reduce ladder fuels to protect old growth structure, and set stands on a trajectory towards becoming dry forest old growth habitats, which are currently lacking compared to historical conditions. Treatments would also reduce the risk of losing these habitats to wildfire.

Lynx habitat comprises little of the project area, and early-successional stands providing hare forage would not be treated. Critical habitat for lynx comprises a much greater proportion of the project area, but is largely dry forest that won't contribute to boreal forest conditions. Treatments would occur over 17% of the critical habitat.

About 4% of the current goshawk habitat would be treated, with 34% remaining across the project area. Large trees would be retained, and understory stand densities would be reduced. Habitat diversity would result from the treatments and would provide prey habitat. Roads open to public use would increase by 0.4 miles, during project activities. Opening of 1.9 miles of closed roads to public use would occur would in alternative 2, post-activities, with a net open road increase of 5.4 miles which wouldprovide more access for falconers than current conditions. Alternative 3 would reduce open roads by 6.8 miles and would protect goshawk nests better than alternative 2.

Habitat for western gray squirrels would be degraded by opening of the canopy, which could reduce arboreal travel. However, the habitat would be better protected from large-scale disturbance from wildfire, insects and disease spread. Roads would increase in alternative 2, increasing chance of mortality through vehicle strikes.

Habitat on mule deer winter rangewould experience moderate short- to long-term mixed effects, occurring on 8% of the winter range. Forage would be increased in the short and longer term, but cover would be reduced, although adequate cover would still remain. Post-treatment cover levels would be lower than Forest Plan standards and guidelines, however. To mitigate this, and to provide for adequate cover distribution across the project area, each ladder fuel reduction unit would leave 20% of the area untreated, in patches from 0.1 acre to multiple acres in size.

Since the time that the Forest Plan was written, studies have found that thermal cover is not as critical as forage quality and quantity for winter survival of ungulates (Forest Restoration

Strategy, 2012). Population declines in the region have been attributed to reduced shrub diversity, declining productivity of aging shrubs and lack of recruitment of new shrubs due to fire suppression (Fitkin and Heinlen, 2012, 2015), rather than thermal cover.

The Okanogan-Wenatchee Restoration Strategy suggests that emphasizing the reduction of road density and enhancement of forage, can allow reduction in thermal cover while meeting the intent of standards for deer winter ranges, to resolve the potential conflict between restoring forests and winter range thermal cover.Road decommissioning on winter range would be a long-term beneficial effect. Decommissioning of currently open roads would occur on 2.2 miles.Approximately 1.2 miles of temporary road would be constructed in winter range, open for logging use, then decommissioned. Disturbance could occur to deer on winter range and may result in displace from active units, but would be short-term in nature.

Landbirds using open stands and those using riparian habitats would be benefitted by vegetation and other non-road treatments. Treatments would improve habitat conditions for white-headed woodpeckers and gray flycatchers, both sensitive species preferring more open habitats. There would be less habitat for species using denser stands of small trees, such as the varied thrush. However, vegetation treatments occur on a small portion of the project area, about 1/3, and abundant dense habitat would remain over 2/3 of the area.

Alternative 3 reduces disturbance, habitat avoidance, access and related mortality to wildlife species compared to the current condition. Alternative 2 decommissions 2.3 miles of open roads and results in66.1 miles of open roads (13.2 miles administrative use only).Alternative 3 decommissions 6.1 miles, and results in44.7 miles of open roads (4.7 miles administrative use only) making alternative 3 the more beneficial alternative to wildlife species.

Determinations for threatened species are, for both alternatives:

> **"*May affect, not likely to adversely affect*"** gray wolves, grizzly bear, spotted owls, lynx and Critical Habitat for lynx.

Sensitive species determinations (for species considered in detail) are:

"May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species" for goshawks, gray flycatchers, white-headed woodpeckers and gray squirrels for alternative 2.

For alternative 3, the determination is: ***"May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species"***for gray squirrelsand***"beneficial impact"*** for goshawks, gray flycatchers, and white-headed woodpeckers, due to the more open conditions resulting from vegetation treatments.

MIS Species determinations for winter range are ***"will improve conditions for mule deer on winter range in the project area, and will not contribute to a negative trend in viability on the Forest."***

Degree to Which the Purpose and Need for Action is Met

The Mission proposed vegetation treatments partially counteract the effects of past fire suppression and logging on wildlife habitats, which have become denser with fewer large trees,

on 1,952 acres, about 6% of the project area. The vegetation treatments will reduce competition around the larger trees, accelerating development of large tree habitats that are important for many species. Fuels treatments and non-commercial thinning will reduce risk of fire to the remaining large tree habitat and accelerate growth of small trees into larger trees. This would affect an additional 8,163 acres, 24% of the area. However, the landscape would become more open, and emulate the more open habitat conditions present prior to fire suppression.
The effects of past management on spotted owl habitat is mixed- denser, more suitable stands resulted from fire suppression, but logging preferentially removed the largest trees important for nesting. This project would create some open, large tree habitat over a relatively small portion of the two drainages (6%), and this habitat (and more) would be better protected from wildfire, insects and disease, and competition-related mortality, over about 24% of the area. However, it is still a dry landscape, predicted to become drier, and will probably never be more than marginal habitat for spotted owls. Habitat for owls would remain in scattered, isolated patches, but the treatments would result in larger blocks of large tree habitat in the long-term.

Habitat connectivity of forested habitats would remain high, but become more open on 30% of the area. Important riparian corridors and ridgetop habitat would remain as effective corridors, as regeneration harvest would occur on only a minor portion of the habitat- 80 acres (0.2% of the area).

Meadow habitat would be improved and retained by the cutting of encroaching conifers on several acres around and in 2 meadows.

Treatments would improve retention of large trees used by goshawks, white-headed woodpeckers, gray squirrels and other species and would accelerate development of additional large tree habitat over 6% of the area.

Early successional habitat would be created on the 80 acres of regeneration harvest. Aspen treatments in the boreal habitat would provide additional hare forage.

Road actions would result in an overall increase in open road densities with alternative 2, although 13.2 miles would be administrative use only and receive infrequent use, which would make it similar to the current condition. Alternative 3 would reduce open road densities by 12 miles over the present condition. Alternative 3 improves the condition of wildlife habitats by closing open roads, thus reducing disturbance, habitat avoidance, snag loss and potential for mortality from vehicle strikes, access for hunting, trapping and poaching.

Other Agencies Consulted

Consultation with U.S. Fish and Wildlife Service was initiated in October, 2016.

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Appendix A

General Effects of the Proposed Actions

Fuels Treatments

Ladder fuel reduction thinnings (LFR) and Timber stand improvement (TSI): LFR treatments outside of harvest unitswould occur over approximately 19% of the project area, and noncommercial thinning would occur on another 5%. These treatments are expected to:

- Reduce stand density and canopy closures. LFR treatments that are not associated with harvest units, and would have follow-up treatments of hand piling, underburning or mastication are expected to reduce canopy closure up to 20-30%.
- Remove smaller size class trees.
- Reduce competition on large trees from small trees.
- Reduce risk of wildfire and insect activity.
- Increase understory shrub, grass and forb components over time, due to increased light to ground from reduced overstory canopy.

For wildlife species, this would mean a slight reduction in habitat connectivity (canopy continuity reduced), more open stand conditions, which would favor species preferring that habitat type and be detrimental to those using closed canopy conditions, decreased escape and thermal cover, and short-term disturbance during implementation. Increased food resources are expected as a result of increased mast (from accelerated growth of larger trees) and increased shrub/forb/grass component from decreased canopy closure.

Negative effects would be partially mitigated by leaving 20% of the area in each fuels unit untreated, in patches from 0.1 acre to multiple acres. This would provide some thermal and hiding cover for mule deer and other species, help to reduce loss of snags and down wood, increase habitat diversity, and provide some connectivity between more open areas.

The effects would over about ¼ of the project area, would last 10-20 years before canopy closures and stand densities become high again, and understory is decreased, would occur as soon as project is implemented (except for understory response which would occur within 1-5 years), and are likely to occur.

Prescribed Fire: This includes underburning within harvest units and non-commercial units, and pile burning. Underburning would occur over approximately 5% of the project area. Pile burning would occur on approximately 10% of the project area.

Underburning/landscape burning is expected to:

- Increase small snags and decrease large and soft snags. This would occur immediately and over the next several years, post-burn.
- Reduce large woody debris slightly immediately.
- Decrease understory canopy closure, shrub and grass/forb cover for 1 to 10 years (Pilliod et al. 2006). Underburning without other treatments is expected to reduce canopy closures up to 7%.
- Provide patchy openings, which will continue until trees re-grow, probably over a 10-20 year period.
- Decrease risk of severe effects from wildfire over 10-20 years.

- Increase understory shrub, grass and forb components over time, due to increased light to ground from reduced overstory canopy. This would last until the understory closes again, in 10-40 years.

Results to habitat and wildlife are expected to be:

- Increased structural complexity and habitat heterogeneity (except multiple entries with prescribed fire may reduce structural diversity over time) (Pilliod et al. 2006). Large burns (>2,500 acres) may potentially homogenize the landscape for some species and decrease overall wildlife habitat (Brown et al. 2004).
- Increased small diameter snags that provide temporary foraging habitat for some species (woodpeckers on wood-borers and bark beetles). However, small snags are usually too small to provide nest cavities (Pilliod et al. 2006). This effect is short-term, as small snags fall quickly.
- Some direct mortality may occur, particularly to ground-nesters and low-nesting species in spring burning, but is expected to be minor.
- Wildlife and invertebrate species that depend on down wood, snags, mistletoe brooms, dense forest with abundant saplings and small poles, and closed canopy-forests for survival and reproduction are likely to be detrimentally affected by fuel treatments altering those elements (Pilliod et al. 2006).
- Species that are associated with fairly open canopies and open forest floor may benefit (Pilliod et al. 2006).
- Increased food sources of fruits, berries, mast crops and herbaceous plants, from accelerated growth on large trees and reductions in canopy closure (more light to ground).

As with thinning treatments, slight reduction in habitat connectivity, more open stand conditions, which would favor species preferring that habitat type and be detrimental to those using closed canopy conditions, decreased escape and thermal cover, and short-term disturbance during implementation are expected to occur.

Pile-burning can be expected to result in small patches of bare ground (4'x4' for hand piles, 10'x10' for machine piles) in the areas where piles are located. These patches would last several years, until grass/forbs re-establish.

Other components of the fuels treatments include hand or machine-piling, and creation of firelines by hand or machine. These activities would add additional short-term disturbance and short-term vegetation loss. Revegetation of lines occurs fairly quickly and should be complete in less than 5 years.

Harvest Units: This includes all commercial units. Harvest units cover 6% of the project area, with regeneration harvest 0.1% of the project area. Commercial harvest would be followed with fuel treatments of one or more types.

Effects of thinning would be similar to those in the LFR thinnings, above, except that the size class of trees removed would be larger, up to 21" dbh maximum in most cases. Canopy closures are expected to be reduced 30-60%, depending on the prescription and the fuels treatments. Harvest prescriptions would be consistent with the Forest Restoration Strategy, and would provide for leaving clumps and patches of trees. Ares et al. (2009) found that understory species richness increased, post-thinning, and that gaps and leave islands increased richness. This would provide more diverse habitats for wildlife species.

Snags that are a safety concern to workers in the units would be cut in harvest units and along unit fire lines. It is not known at this time how many snags would be lost through harvest, since that depends on many factors, including stand history, firewood cutting, topography, etc.

Monitoring of pre- and post-harvest snag levels in the Hungry-Hunter area to the south of the project area indicated that 0.36 snags per acre were lost. This was an approximately 24% loss of snags. Forest plan monitoring in 2003 indicated a loss of 0.71 snags per acre, a 55% loss. Using an average of 0.5 per acre loss, this means that 976 snags would be cut as hazard trees, roughly 1/3 of the snags in the units. Snag level information is not available for the project area, but using the average of 1.54 snags per acre derived from the 2 previous snag counts, about 2% of the area snags would be cut. This is an extremely rough estimate, as snags are distributed patchily across the landscape, rather than uniformly, and areas along roads and within units have lower snag levels (Wisdom and Bates, 2008). Effects of snag loss would be limited to the unit boundaries and firelines, and would result in reduced nesting, roosting and foraging habitat for the primary cavity nesters and other snag-associated species until competition, insects, disease and wildfires produce additional snags. The ICO marking guidelines would partially mitigate the potential snag loss, as "clumps" of retained trees are centered around high-value snags and down wood to create complex patches and leave areas.

Snags would be created in 76 acres of aspen restoration units, where conifers 10-21" dbh would be girdled to prevent eventual shading of aspen.

Several studies have been conducted on the Okanogan and Wenatchee National Forests evaluating the effects of management activities on snag habitat. Initiated in 2001, the fates of 1,133 snags within five dry-forest restoration projects were monitored, and reported in three studies (Gaines et al. 2007, Lyons et al. 2008, Gaines et al. 2010).

Changes in snag density following forest management activities on the Okanogan-Wenatchee National Forest within dry and mesic forests

	Changes in Snag Density as a Result of Vegetation Treatments		
Snag Size (Inches DBH)	Mechanical thinning only	Prescribed fire only	Mechanical and prescribed fire
6-10	-48%	+14%	+55%
10-20	-34 %	+10%	+45%
>20	-30%	0%	+100%

Based on these results, 652 acres could have substantial decreases in snags (mechanical thinning with LFR only), while 1,091 acres could have substantial increases in snags (mechanical thin, LFR and prescribed fire). These changes would be concentrated in the areas near roads where the units are proposed, and would likely result in increased numbers of smaller diameter snags, while losses would occur in the older, soft snag classes used by flammulated owls, Lewis' woodpecker and other species that excavate or use soft wood.

Road Opening, Closures and Decommissioning would occur to support sale activities and to implement recommendations for the road network made in during the Mission Minimum Roads Analysis process.

Roads are generally associated with negative effects on both terrestrial and aquatic ecosystems (Trombulak and Frissell, 2000). Alternative 3 would result in a decrease in net open road density compared to the current condition. This would have positive effects for most wildlife species. However alternative 2 would result in an increase in open road density, although 13.2 miles would be open for administrative use only. This would be a slight negative effect for wildlife species.